Spectrum® Technologies, Inc.

"To Measure Is To Know"

2008
INTERNATIONAL

www.specmeters.com

20 PLUS YEARS OF SERVING YOU!

Thank you for joining us as we mark our 21st year of service to the agricultural and horticultural industries, as well as to research professionals throughout the world.

As we celebrate our long history, we'd like to thank all of our customers for making our success possible. While much has changed in the last 21 years, our commitment to product innovation and outstanding customer service remains the same. Our distributors, a select group of the industry's leading suppliers, enhance this capability by providing expert product advice and access to our complete product line in over 80 countries around the world. You can count on Spectrum for the field measurement tools you need, today and tomorrow.

Best wishes for a safe and productive year.

Sincerely,

David Lau
International Business Director

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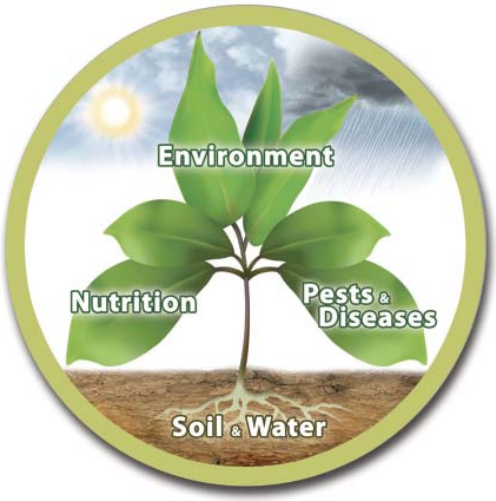
What affects plant growth?



- **Environment:** Temperature, Light, Rain, Relative Humidity, and Leaf Wetness
- **Nutrition:** Nutrients (N-P-K), Chlorophyll, and pH Levels
- **Pests and Diseases:** Insects, Diseases, and Nematodes
- **Soil and Water:** pH, Soil Moisture, Soil Compaction, Water Quality, and Soil Gases

***Spectrum®* Technologies** *is your source for field measurement technology!*

Award Winning Products

The American Society of Agricultural and Biological Engineers has named fourteen Spectrum products AE50 award winners. These products were selected by a panel of experts in the agricultural, food and biological systems industries for the ability to save producers time, cost and labor while operating in an environmentally-friendly fashion.

AE50 outstanding innovations
AWARD WINNER
FOR TECHNOLOGY INNOVATION

- **• 1999** StarLogger™ Data Logger
  Investigator™ Soil Compaction Meter
  WatchDog® Leaf Wetness/Temperature Logger
- **• 2000** WatchDog® Data Logger
- **• 2001** Field Scout® CM 1000 Chlorophyll Meter
- **• 2002** WatchDog® Weather Station
  Field Scout® TDR 300 Soil Moisture Meter
- **• 2003** WatchDog® Weather Tracker
  Field Scout® SC 900 Soil Compaction Meter
- **• 2004** Field Scout® Direct Soil EC Probe
  Field Scout® TCM 500 Turf Color Meter
  WeatherTracker™ Greenhouse Growth Tracker
- **• 2005** Spec 7 Pro® Software
- **• 2007** WatchDog® 2000 Series Mini Weather Station

3 Easy Ways to Contact Us

☎ Phone

To reach us by phone, dial 01/ 815-436-4440 to speak with our knowledgeable, friendly staff about your application needs, measurement questions, or for information on local Spectrum distributors. Hablamos Español.

Online

Please come visit us online at www.specmeters.com. It's a fast and easy way to find additional information for any product. While you visit, stop by our support library for technical information, product manuals, and more.

Fax

Contact us 24 hours a day by faxing your questions or requests to 01/ 815-436-4460. Be sure to include your contact information. We'll process your inquiry promptly and contact you with answers to your requests.

WatchDog® Data Collection Systems

Product Series Overview

WatchDog® 2000 Series Weather Stations

The affordable, customizable solution for growers, consultants, researchers, or anyone who deals with weather conditions as part of their job. Monitor over a dozen important growing conditions for effective crop and pest management. Now with 12-bit accuracy and resolution and more external sensor ports with weatherproof connectors. Use the exclusive LCD display to review historical data, or to see severity indicators from onboard plant disease models. Monitor real-time conditions using new wireless communication options. **See pages 6-7**

WatchDog® 2000 Series Mini Weather Stations

Sharing the power, flexibility, and accuracy of the 2000 Series Weather Stations, the 2000 Series Mini Stations provide an affordable solution for logging four channels of weather sensor values. With the same wide selection of sensors and wireless communications options, the Mini Stations are ideal for monitoring microclimates, or where the increased sensor capabilities of the Weather Stations are not required. The NEMA-4 type IP 66 enclosure and weatherproof connectors provide greater reliability in harsh outdoor environments, while the exclusive LCD display allows you to review historical data or see severity indicators from onboard plant disease models. **See pages 8-9**

WatchDog® 200/400 Series Data Loggers and Mini Weather Stations

The perfect choice for soil moisture monitoring, disease forecasting, or other applications where a complete weather station isn't necessary. Mix and match the best combination of loggers and sensors to meet your budget and needs. **See pages 14-16**

WatchDog® 100 Series Economy Loggers

Ideal for measuring one or two parameters. Small size, low per-unit cost, and robust, weather-resistant design make the economy loggers ideal for a variety of measurement applications. **See page 17**

WatchDog® Sprayer Station

Monitor and data log weather conditions with the ultrasonic WatchDog Sprayer Station: the compact all-in-one weather station that measures air temperature, humidity, dew point, wind chill, barometric pressure, and apparent wind speed and direction. While on-the-go, the station uses its internal compass and GPS to compute the true wind speed and direction. **See pages 24-25**

WATCHDOG PRODUCT LINE

REFERENCE:

- • STANDARD
- **OPT** OPTIONAL
- **BLANK** NOT AVAILABLE

STANDARD FEATURES | OPTIONAL SENSORS & ACCESSORIES

Parameters:		Evapotranspiration	LCD Display	Wireless-Ready	Alarm Output-Ready	Air Temperature Sensor	Relative Humidity Sensor	Dew Point	Wind Speed and Direction	Tipping Bucket Rain Collector	Solar Radiation Sensor	External Sensor Ports	Quantum Light Sensor	Ext.(Soil) Temperature Sensor	Leaf Wetness Sensor	Watermark Soil Moisture	Barometric Pressure Sensor
		ET	**LCD**		**Alrm**	**Tmp**	**RH**	**Dew**	**Wind**	**Rain**	**Solar**		**PAR**	**Temp**	**LW**	**SM**	**Bar**
Item	**Item#**			3391	3672					3665R	3670I		3668I	3667	3666	6450WD	3671
Weather Stations (prepackaged units with LCD display, external sensor ports, and wireless communication options)																	
2900ET	3350WD2	•	•	•	•	•	•	•	•	•	•	5	OPT	OPT	OPT	OPT	OPT
2800	3345WD2		•	•	•					OPT	OPT	9	OPT	OPT	OPT	OPT	OPT
2700	3340WD2		•	•	•	•	•	•	•	•	OPT	6	OPT	OPT	OPT	OPT	OPT
2550	3320WD2		•	•	•	•	•	•	•		OPT	6	OPT	OPT	OPT	OPT	OPT
2000 Mini Station (affordable 4 channel datalogging units, featuring LCD display and wireless communication options)																	
2475	3686WD		•	•	•	•	•	•		OPT	OPT	1	•	OPT	OPT	OPT	OPT
2450	3684WD		•	•	•	•	•	•		OPT	OPT	2	OPT	OPT	OPT	OPT	OPT
2425	3683WD		•	•	•	•				OPT	OPT	3	OPT	OPT	OPT	OPT	OPT
2400	3685WD		•	•	•					OPT	OPT	4	OPT	OPT	OPT	OPT	OPT
200-400 Series Mini-Stations (mix and match components for affordable 2-4 channel datalogging units featuring LCD display)																	
450	3684		•			•	•			OPT	OPT	2	OPT	OPT	OPT	OPT	
425	3683		•			•				OPT	OPT	3	OPT	OPT	OPT	OPT	
400	3685		•							OPT	OPT	4	OPT	OPT	OPT	OPT	
250	3682		•			•	•					0					
225	3681		•			•				OPT	OPT	1	OPT	OPT	OPT	OPT	
200	3680		•							OPT	OPT	2	OPT	OPT	OPT	OPT	
100 Series Economy Loggers (economic datalogging units for 1-2 parameters)																	
130	3610TWD					•						0			•		
120	3554WD									•		0					
150	3612WD					•	•					0					
125	3617WD					•						0		•			
115	3635WD									OPT		0					
110	3618WD					•						0					
100-2K	3619WD					•						0	(requires item 3655K2 Docking Station)				
100-8K	3620WD					•						0	(requires item 3655K2 Docking Station)				
100-T/RH	3621WD					•	•					0	(requires item 3655K2 Docking Station)				
Mobile Sprayer Station (a compact unit providing on-the-go weather monitoring)																	
3349SS						•	•	•	•			0					•

For More Information on Customizing Your Station,
Please Contact Us By Email or at +001 (815) 436-4440

WatchDog®

2000 Series Weather Stations

Model 2900 ET
Customize this unit to meet your deployment needs with our sensors on **page 10-11**.

Powerful
Accurate
Robust

NIST calibration is available for temperature and RH sensors on most WatchDog products. Call for details.

Management solutions for:

- Early pest/disease forecasting
- Efficient irrigation management
- Microclimate and field research

AE50 outstanding innovations
AWARD WINNER
FOR TECHNOLOGY INNOVATION

Why base your important growing decisions on distant university or airport weather reports? WatchDog 2000 Series Weather Stations deliver accurate, real-time weather information directly from your orchard or vineyard. Together with Spec 8 Pro software, you can monitor, record and analyze over a dozen important growing conditions for more effective and profitable crop and pest management.

Built-in data logger - Store your measurements in fail-safe, non-volatile memory until you transfer the data to your PC. Select measurement intervals of 1,5,10,15,30, or 60 minutes. With a 30 minute interval, the station will retain 183 days of data. Downloading data will not erase it from the station, so multiple PCs can access the station without impacting a master data collection plan.

Enhanced LCD Display - A WatchDog exclusive. Check current and daily high/low readings for the past 30 days or confirm the station and sensors are performing — without connecting to a PC. Select Spec 8 Pro disease models can run on the station, providing field viewing of disease severity indicators.

Battery powered - A 12-month battery power source (four "AA" alkaline batteries included) means no solar panels to purchase and maintain. WatchDog 2000 Series Weather Stations use state-of-the-art electronics with low power consumption.

Communication options - Suit your specific needs by choosing from direct connection, wireless, cellular or other data transfer options (see pages 12-13).

Customize your station - with plug-in sensors. Over a dozen sensors, such as leaf wetness, soil moisture or temperature are available (see pages 10-11).

WATCHDOG WEATHER STATION FEATURES

Sensors	Wind Speed	Wind Direction	Air Temp	Relative Humidity	Rainfall	Solar Radiation	External Sensor Ports
Model 2900ET	●	●	●	●	●	●	5
Model 2800	N/A	N/A	Opt.	N/A	Opt.	Opt.	9
Model 2700	●	●	●	●	●	Opt.	6
Model 2550	●	●	●	●	N/A	Opt.	6

Specifications	**Accuracy**
Wind Direction: 2° increments	±7°
Wind Speed: 0 to 150 mph, 0 to 241 km/h	±5%
Temperature: -25° to 212°F; -32° to 100°C	±1°F, ±0.6°C
Humidity (Models 2550, 2700, 2900ET): 10% to 100% @ 5° to 50°C	±3%
Dew Point (Models 2550, 2700, 2900ET): -99° to 140°F; -73° to 60°C	±4°F, ±2°C
Rainfall (Models 2700, 2900ET): 0.01" (0.25mm)	±2%

Spec 8 Pro software required.

WatchDog® Model 2900ET

The most powerful package for optimizing your irrigation and IPM decisions

Optimize your irrigation and IPM programs with this powerful weather station. The comprehensive water management system enables you to assign discrete K-factors to each crop/field you track for evapotranspiration and irrigation amounts.

The WatchDog Model 2900ET measures, calculates and logs:

- Evapotranspiration (ET_o)
- Rainfall
- Solar radiation
- Relative humidity
- Wind speed and direction
- Dew point
- Air temperature
- Up to 5 external sensors

Item 3350WD2 WatchDog 2900ET Weather Station

WatchDog® Model 2700

The WatchDog 2700 Station is an affordable and versatile solution for growers, researchers, and consultants.

The WatchDog 2700 measures, calculates, and logs:

- Wind speed & direction
- Dew point
- Relative humidity
- Air temperature
- Rainfall
- Up to 6 external sensors

This versatile station offers all of the features of the 2900ET except for evapotranspiration and solar radiation.

Item 3340WD2 WatchDog 2700 Weather Station

WatchDog® Model 2550

Ideal for fast, on-demand deployment or temporary installations such as hazmat or pesticide application. Measure wind speed/direction, temperature, RH, dew point and up to six external sensors.

Item 3320WD2 WatchDog 2550 Weather Station

WatchDog® Model 2800

The WatchDog 2800 Station is ideal where multiple sensor measurements are required for temperature, soil moisture, crop canopy light, or leaf wetness data. Customize the station to your application by choosing up to eight plug-in sensors, plus one optional rainfall sensor. The 2800 Station features the same memory, power source and LCD as other WatchDog stations, and accepts the same communication devices and sensors.

Item 3345WD2 WatchDog 2800 Weather Station

Customize Your Station with These Accessories

Tripod Mount

Rugged folding galvanized steel tripod. Includes bolts to secure center post.

Item 3396TP Tripod Mount

Alarm Output Module

Trigger an external device based on sensor readings. Use for temperature alarm, to actuate irrigation, close greenhouse vents, and more. 1A max switching current. Selectable NC/NO operation.

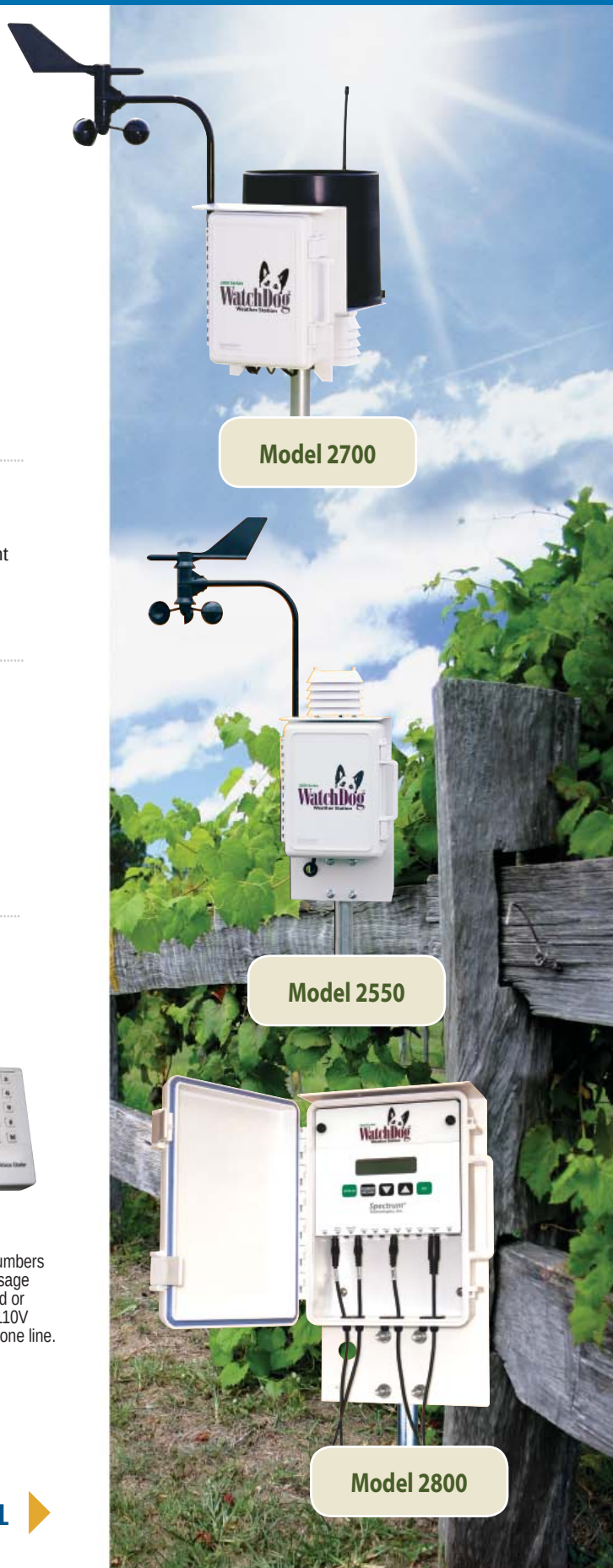
Item 3672 Alarm Output Module

AutoDialer

Dials up to four phone numbers with a pre-recorded message when actuated by opened or closed circuit. Requires 110V power source and telephone line.

Item 3419 AutoDialer

SEE SENSOR INFORMATION ON PAGES 10 - 11



WatchDog®

2000 Series Mini Stations

Professional grade solutions for:

- Plant growth monitoring
- Early pest/light forecasting
- Efficient irrigation management
- Microclimate monitoring

With the same power, flexibility, and accuracy as the 2000 Series Weather Stations, the 2000 Series Mini Stations provide an affordable solution for logging four channels of weather sensor values. With the same wide selection of sensors and wireless communications options, the Mini Stations are ideal for monitoring microclimates, or where the increased sensor capabilities of the Weather Stations are not required. The NEMA-4 type IP 66 enclosure and weatherproof connectors provide greater reliability in harsh outdoor environments. **Spec 8 Pro software required.**

Built-in data logger - Store your measurements in fail-safe, non-volatile memory. Select measurement intervals of 1,5,10,15,30, or 60 minutes. With a 30 minute interval, the station will retain 198 days of data. Downloading data will not erase it from the station, so multiple PCs can access the station without impacting a master data collection plan.

Flexible Sensor Options - Add 1-4 external sensors to your Mini Station to record the parameters you need. See pages 10-11 for a wide range of sensors.

Enhanced LCD Display - A WatchDog exclusive. Check current conditions and high/low readings for the past 30 days or last 12 months. Confirm the station and sensors are performing - without connecting to a PC. Select Spec 8 Pro disease models can run on the station, providing field viewing of disease severity indicators.

Battery powered - A 12-month battery power source (four "AA" alkaline batteries included) means no solar panels to purchase and maintain. WatchDog Mini Stations use state-of-the-art electronics with low power consumption.

Alarms - With the optional alarm module (see page 7) or through Spec 8 Pro software, send a warning if a sensor exceeds high and low limits.

Communication options - Suit your specific needs by choosing from direct connection, wireless, cellular or other data transfer options. See pages 12-13 for details.

See **Spec 8 Pro software** on page 18-19

Do Your Plants Have a Fever?

Monitor their health by measuring IR temperature with the new Infrared Temperature Sensors. Research shows that plant stress causes elevated leaf temperatures. Measure and log both plant and air temperatures when used with the WatchDog 2000 Mini and Weather Stations. Available in two models with 4:1 field of view (5cm at 20cm). Includes adjustable mounting bracket.

IR Temperature Sensor with Solar Power
Includes a solar power module which will run the sensor for up to 8 days without sunlight.

Item 3676S **IR Temperature Sensor with Solar Power**

IR Temperature Sensor Basic
The economical Basic model is designed for use where power is available. Requires a 12VDC 5mA power supply.

Item 3676B **IR Temperature Sensor Basic**

WatchDog® Model 2475 Plant Growth Station

PAR light intensity, Daily Light Integral, day/night average temperatures, degree days, and more! The Plant Growth Station monitors and records temperature, humidity, dew point, and light conditions anywhere in your greenhouse. Easily check current conditions and up to twelve months of historical data on the LCD display. Calculate DLI to adjust your shade and light hours. Supports one external sensor. **Spec 8 Pro software required.**

Item 3686WD **WatchDog Model 2475 Plant Growth Station**

WatchDog® Model 2450 Temperature/RH Station

Measure air temperature, relative humidity, dew point, and up to two external sensors. **Spec 8 Pro software required.**

Item 3684WD **WatchDog 2450 Temperature/RH Station**

WatchDog® Model 2425 Temperature Station

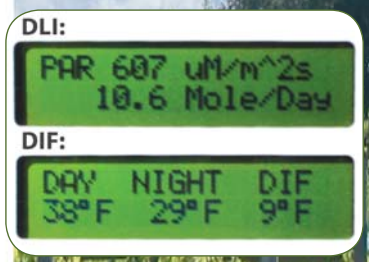
Measure air temperature and up to three external sensors.
Spec 8 Pro software required.

Item 3683WD **WatchDog 2425 Temperature Station**

WatchDog® Model 2400 External Sensor Station

The WatchDog 2400 Station is ideal where multiple sensor measurements are required for temperature, soil moisture, crop canopy light, or leaf wetness data. Customize the station to your application by choosing up to four plug-in sensors (if you require more than four sensors, consider the 2800 Weather Station on page 7). **Spec 8 Pro software required.**

Item 3685WD **WatchDog 2400 External Sensor Station**



WatchDog® Sensors and Accessories

Customize Your Stations and Loggers for:

Soil temperature and moisture · Light measurement · Plant growth

Leaf Wetness Sensor

Measure leaf wetness with this grid-like, resistance-based sensor. Range: 0 (dry) to 15 (wet).

Item 3666 Leaf Wetness Sensor

External (Soil) Temperature Sensor

Measure soil, air, or water temperature with this resistance-based sensor.
Range: -30°C to 100°C. Accuracy ± 0.5°C.

Item 3667 External Temperature Sensor 1.8m

Item 3667-20 External Temperature Sensor 6.1m

Temperature (Micro) Sensor

Measure surface temperature of leaves and other applications with this micro-sensor.
Range: -30°C to 100°C. Accuracy ± 0.5°C.

Item 3667S Temperature (Micro) Sensor

Watermark Soil Moisture Sensor

Measure soil moisture with this modified Watermark sensor. Resistance-based sensor reads moisture from 0 (saturated) to 200 (dry) centibars.

Item 6450WD20 Watermark Sensor 6.1m

Tipping Bucket Rain Collector

Measure rainfall in 0.254mm increments with this self-emptying, freeze-resistant rain sensor. Meets WMO guidelines. Accuracy ± 2%.

Item 3665R Tipping Bucket Rain Collector

Barometric Pressure Sensors

Measure air pressure in metric (mm) or U.S. (inches) of Hg. **Standard:**Range: 660 to 810mm (26" to 32"). Accuracy: ±0.05" (± 1.3mm).**High altitude:**Range: 476-841 mm-Hg (18.75-33.1 in-Hg). Accuracy: ±1.4mm (±0.057"). **For Stations Only.**

Item 3671 Barometric Pressure Sensor

Item 3671M Barometric Pressure Extended Range

Irrigation On/Off Sensor

Record and analyze relationships between irrigation periods and soil moisture with this sensor. Standard threading plumbs into irrigation line and trips on at 24.4 kg/sqm. One per logger.

Item 6451 Irrigation On/Off Sensor

Pressure Transducer

Adapts to new and exisiting Irrometer tensiometers. Allows the use of the dial gauge for real-time measurements. Maximum of two per logger, no limit for stations. Accuracy ± 2%.

Item 3669 Pressure Transducer

$C0_2$ Sensor

Measure $C0_2$ levels in ppm using NDIR technology. Also functions as a hand-held meter. Requires battery or 6V power (adapter included). Range: 0-4000ppm.

Item 2655 $C0_2$ Sensor

Watermark Adapter

Use to adapt standard Watermark sensors for use with WatchDog equipment. Not required for 6450WD sensors.

Item 6450ADPT Watermark Adapter

ECH$_2$O Adapter

Adapt standard Decagon ECH$_2$O EC-20, EC-10, and EC-5 sensors for use with WatchDog 2000 Series Weather Stations.

Item 6452ADPT ECH$_2$O Adapter

Extension Cable

6 meter extension for all sensors. Connectors should be weather-proofed on installation. Call for details on extensions longer than 6 meters.

Item 3664 Extension Cable

4-20mA Input Cable

Collect data on any current loop device with 4-20mA output. Includes 1.8m cable with 1.27cm tinned wire leads.

Item 3674 4-20mA Input Cable

Replacement RH Sensor

Relative humidity sensors begin to drift after 2 years in the environment. Replace your RH sensor and return to like-new accuracy. Specify station or logger model number when ordering.

Item 3612RHB Replacement RH Sensor
(For Logger Models 450, 250, & 150)

Item 3612RHS Replacement RH Sensor
(For WatchDog Weather Stations & Mini Stations)

Alarm Output Module

Trigger an external device based on sensor readings. Use for temperature alarm, to actuate irrigation, close greenhouse vents, and more. 1A max switching current. Selectable NC/NO operation. **For Stations Only.**

Item 3672 Alarm Output Module

Short-Range Modem Pair

Amplify signal for direct connections longer than 23 meters.

For Stations Only.

Item 3365WD Short-Range Modem Pair

Voltage Input Cable

Collect data on any device with 0-2.5v DC output. Includes 1.8m cable with 1.27cm tinned wire leads.

Item 3673 Voltage Input Cable

USB-to-Serial Adapter

Provides a serial port on laptops or desk PCs which have only USB ports.

Item 3661USB USB-to-Serial Adapter

Tripod Mount

Rugged folding galvanized steel tripod. Includes bolts to secure center post.

Item 3396TP Tripod Mount

Magnetic Base

Strong magnetic post is ideal for vehicle mounting or other applications.

Item 3396MB Magnetic Base

For More Information on Customizing Your Station Contact Your Local Distributor

New Light Sensors

Plants need light, so you need light sensors to measure how much your plants are actually receiving. For 2008, Spectrum Technologies adds three new light sensors and lowers prices on our existing sensors. Our entire line features improved cosine correction, mounting brackets, a built-in level, and can be used with WatchDog Weather Stations and Data Loggers as well as our new handheld FieldScout External Light Sensor Meter (see page 27).

Quantum Light Sensors

Measure radiation between 400-700 nanometers (PAR - photosynthetically active radiation). Range: 0-2500 µmol m^{-2} s^{-1}. Accuracy: ±5%.

Item 3668I **Quantum Light Sensor**

3 Sensor Quantum Bar – NEW!

Three cosine corrected Quantum sensors (spaced 4.6in/11.7cm) average their readings to minimize the effects of small shadows such as below a canopy or in a greenhouse. Output is the same as Item 3668I, the single Quantum Sensor.

Item 3668I3 Quantum Light 3 Sensor Bar

6 Sensor Quantum Bar - NEW

Six cosine corrected Quantum sensors (spaced 2.3in/5.9cm) average their readings to minimize the effects of small shadows such as below a canopy or in a greenhouse. Output is the same as Item 3668I, the single Quantum Sensor.

Item 3668I6 Quantum Light 6 Sensor Bar

UV Light Sensor - NEW

Measure critical ultraviolet radiation between 250-400 nanometers.

Range: 0-200.0 µmol m^{-2} s^{-1}. Accuracy: ±5%.

Item 3676I
UV Light Sensor

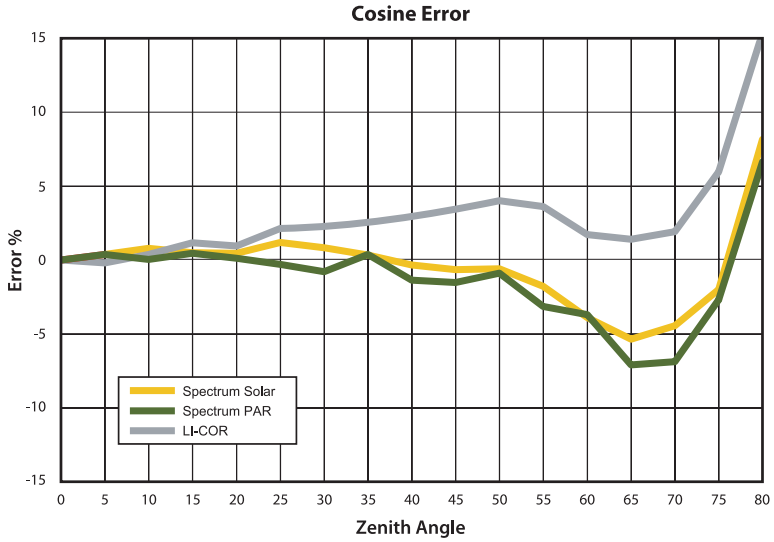
Silicon Pyranometer Sensor

Measure radiation between 300-1100 nanometers.

Range: 1-1250 Watts/m^2. Accuracy: ±5%.

Item 3670I
Silicon Pyranometer Sensor

Spectrum Technologies light sensors feature cosine correcting diffusion disks to ensure the greatest aggregate accuracy when used to measure 24 hour incident light, such as for the Daily Light Integral (DLI).



See page 9 for the IR Temperature Sensor.

WatchDog® Connectivity

Connect Your WatchDog Station to Your World

WatchDog 2000 Series Data Shuttle

Transport your weather data to your host PC. Memory holds data from up to 8 full 2000 Series Mini Stations or 5 full Weather Stations.

Item 3679WD
WatchDog 2000 Series Data Shuttle

USB-to-Serial Adapter

Provides a serial port on laptops or desk PCs which have only USB ports.

Item 3661USB
USB-to-Serial Adapter

Short-Range Modem Pair

Amplify signal for direct connections longer than 75ft/23m.

Item 3365WD
Short-Range Modem Pair

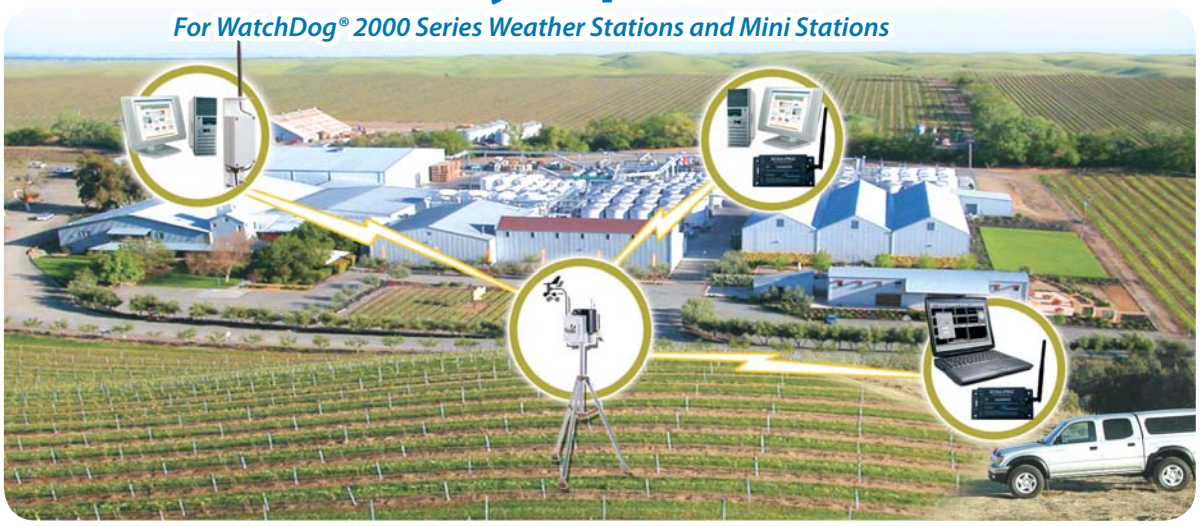
Dial-up Modem

Access a remote weather station via dial-up modem. Requires phone line and 110V power source at weather station. AC adapter included.

Item 3387WD96
Dial-up Modem

Customize Your Station's Connectivity Options

For WatchDog® 2000 Series Weather Stations and Mini Stations



Short Range Wireless Up To 1,000 Feet/300 Meters

Spend less time retrieving data from your weather stations. Connect your PC to one or more remote weather stations up to 300 meters away. Set it up indoors, or head for the fields in your vehicle with your laptop, base station, and optional power adapter for "drive-by wireless". The base station includes a 1.8m serial cable, and connectors for a standard cat-5 cable to extend up to 15m from the PC. The remote radio mounts within the station's enclosure for greater protection and ease of field implementation. Remote radios include whip antenna, solar panel, and rechargable batteries. Transmits at 900 MHz only.

Item 3392B Short Range Wireless Base Station
Item 3392W Short Range Wireless For Remote Weather Station
Item 3392M Short Range Wireless For Remote Mini Station
Item 3392PA Vehicle Power Adapter

Mid Range Wireless Up To 2 Miles/3 Kilometers

Experience the advantages of real-time weather information by connecting your 2000 Series Remote Weather Stations to a PC up to 2 mi/3km away. The base station features a weatherproof case and 50ft/15m cable to allow high mounting for the greatest range. Remotes include whip antenna, solar panel, and rechargable batteries. Specify transmission frequency of 900 MHz, 923 MHz, or 2.4 GHz.

Item 3391B Mid Range Wireless Base Station
Item 3391W Mid Range Wireless For Remote Weather Station
Item 3391M Mid Range Wireless For Remote Mini Station

Optional Yagi antennas increase line of sight range to 7mi/11km
Item 3390YAGI8 8.2 DBi Yagi Antenna (cable required)
Item 3390CABLE10 Yagi Antenna Cable -10ft/3m
Item 3390CABLE20 Yagi Antenna Cable -20ft/6m

Long Range Wireless – Cellular Modem

Access a remote weather station via cellular service. Ideal for systems without phone lines. Requires power source or Battery/Solar Power Package.

Item 3388 Cellular Modem - CDMA
Item 3388SP Battery/Solar Power Package
Item 3388GSM Cellular Modem - GSM

WatchDog® Data Loggers

Actual Size

Affordable and Versatile

WatchDog® Data Loggers

AE50 outstanding innovations
AWARD WINNER
FOR TECHNOLOGY INNOVATION

A complete weather station is not necessary for every application – this is when a WatchDog Data Logger is the perfect choice. Twelve different models provide a wide range of monitoring options. Whether your needs are for plant disease alerts or soil moisture monitoring, this award-winning product will deliver the information you need for timely, accurate decisions that result in increased profits. **SpecWare software required.** Radiation shield (Item 3663) required for outdoor use or indoors when exposed to water spray.

WatchDog® 400/200 Series

Exclusive LCD display – confirms logger operation and provides current sensor readings. You can see how much rain has occurred or how cold the temperature is during a freeze alert – without downloading to a PC. LCD available on 200/400 Series Loggers only.

Built in Data Logger – 400 Series Loggers have a logger capacity of 15,000 measurements (3,750 per channel using all four channels); 200 Series Loggers have a capacity of 7,000 measurements (3,500 per channel using both channels). Select measurement intervals of 1,10,15,30,60 or 120 minutes. A 30-minute interval will record for 78 days before the station's memory is full. Data is stored in safe, non-volatile memory.

Battery Powered – an 8-month battery power source (CR2032 included) means no solar panels to purchase and maintain. WatchDog Data Loggers use state of the art electronics with low power consumption.

Customizable – with up to four plug-in sensors, you can measure only what you need. If your measurement needs change next season, simply connect the sensors you choose. This keeps your investment cost down while enabling you to make more profitable decisions.

Cost-Effective Mini-Stations For:

- Early pest/disease forecasting
- Soil moisture measurement
- Field research/ microclimate data
- Degree-day tracking

WatchDog Data Logger Line and Pricing

DESCRIPTION	INTERNAL SENSOR	EXTERNAL PORTS	LCD DISPLAY
MODEL 450 ITEM 3684	TEMPERATURE RELATIVE HUMIDITY	2	YES
MODEL 425 ITEM 3683	TEMPERATURE	3	YES
MODEL 400 ITEM 3685	NONE (EXTERNAL ONLY)	4	YES
MODEL 250 ITEM 3682	TEMPERATURE RELATIVE HUMIDITY	NONE	YES
MODEL 225 ITEM 3681	TEMPERATURE	1	YES
MODEL 200 ITEM 3680	NONE (EXTERNAL ONLY)	2	YES

WatchDog® Data Shuttle

Launch and download your Shuttle to transport your weather data. Also, a convenient way to read out and relaunch WatchDog Data Loggers (except Model 100 Button Loggers) and bring the data back to your host PC. 128K memory holds data from up to 13 full 100 and 200 Series Loggers and 7 full 400 Series Loggers. Use with Spec 8 software to launch and offload to your desktop PC. Fail-safe, non-volatile EEPROM memory provides added dependability and convenience.

Item 3679 **WatchDog Data Shuttle**

WatchDog® Sliding Enclosure

Water-resistant enclosure mounts to a pole or post. Front plate slides off for easy access. Not recommended for use with loggers featuring internal temp/RH sensors.

Item 3658 **WatchDog Sliding Enclosure**

Radiation Shield

Protect your data logger from rain, solar radiation, or other sources of heat that can distort measurements. Removable top for easy access.

Item 3663 **Radiation Shield**

Customize Your Station Without the Cost of Complex Hardware!

Measure only what you need with WatchDog Data Loggers!

WatchDog® Plant Disease Station

Includes temperature, humidity, leaf wetness, and rainfall sensors.

WatchDog 2000 Series Plant Disease Station (Not Shown)
Includes a Model 2450 Series Mini Station with an enhanced LCD display which allows you to review historical data or to see severity indicators from onboard plant disease models. With optional wireless communications, real-time conditions, including alarms, can also be displayed on your PC.

Item 3684WDPD WatchDog 2000 Series Plant Disease Station

The WatchDog Plant Disease Station
Is based on the Model 450 Data Logger, which is plugged into PC to read out data and create disease reports.

Item 3684PDSR WatchDog Plant Disease Station

WatchDog® Irrigation Station

Affordable WatchDog irrigation management system lets you monitor, compare and evaluate soil moisture from up to three depths with a single WatchDog Data Logger.

2-Sensor Station:
Item 3680SM WatchDog 200 Irrigation Station – Includes Item 3680 WatchDog 200 Data Logger, Item 6450WD Watermark Soil Moisture Sensors (2), and Item 3658 Protective Sliding Enclosure.

3-Sensor Station (not shown):
Item 3685SM WatchDog 400 Irrigation Station – Includes Item 3685 WatchDog 400 Data Logger with 4 external sensor ports, Item 6450WD Watermark Soil Moisture Sensors (3), and Item 3658 Protective Sliding Enclosure. Supports one additional external sensor.

WatchDog®

Data Loggers

Affordable mini-stations for:

- Plant disease forecasting
- Soil moisture monitoring
- Rainfall monitoring

WatchDog® Soil/Air Temperature Station

Collect and record soil and air temperature with this affordable data logging station. Install across multiple microclimates to study microclimate trends.

Measurements are recorded on user-set intervals using the included WatchDog 125 Data Logger. Select intervals of 1, 10, 15, 30, 60 or 120 minutes. A typical data interval of 30 minutes provides 73 days of data before memory is full. Blinking LED confirms operation - conformal circuit board coating prevents moisture damage. Radiation shield protects from solar radiation and other sources of reflected heat. Temperature accuracy ± 1ºF/± 0.6ºC.

Use with SpecWare software for analysis and reporting.

Requires SpecWare software (pages 18-19).

Item 3617WDRS Soil/Air Temperature Station

WatchDog® 120 Data-Logging Rain Gauge

Provides high accuracy with a low-maintenance tipping bucket design

This proven, self-emptying tipping bucket design meets World Meteorological Organization guidelines with an 8in/20.5cm diameter collector. The logger records accumulated rainfall during each interval, maximum of 2.55in/6.5cm per interval. User-selected intervals are 1,5,10,15,30,60 and 120 minutes. Logger capacity is 7,000 intervals.

Use with SpecWare software for analysis and reporting. The logger is conveniently stored inside the rain collector. Accuracy: ±2% at 1in/2.54cm per hour.

Mounting bracket and mounting hardware included. The user-replaceable 3 volt battery lasts 8 months. WatchDog rain collectors and SpecWare software can be programmed to record rainfall in either metric(mm) or US(in) units.

Requires SpecWare software (pages 18-19).

Item 3554WD Data-Logging Rain Gauge

WatchDog® 115 Rain Logger

WatchDog rain logger connects to your existing rain gauge. Records accumulated rainfall over time. User-selected intervals are 1,5,10,15,30,60 and 120 minutes, maximum of 2.55in/6.5cm per interval.

Logger capacity is 7,000 intervals. Flashing LED confirms operation. Includes weatherproof enclosure and 8-month battery.

Requires SpecWare software (pages 18-19).

Item 3635WD WatchDog 115 Rain Logger

WatchDog® 100 Series loggers

WatchDog 100 Series Loggers are an affordable way to track environmental conditions for analysis. Each miniature logger includes sensor(s), 8-month battery, internal clock and fail-safe EEPROM data memory enclosed in a durable casing. 100 Series Loggers sample and record at a user-specified interval (1,5,10,15,30,60 and 120 minutes). A typical data interval of 30 minutes provides 73 days of data before memory is full. A blinking LED light confirms logger is recording. To launch or retrieve data, connect the WatchDog to your PC's serial port. Use SpecWare software to view your data in graphical or tabular format. Radiation shield (Item 3663) required for outdoor use or indoors when exposed to water spray. **Requires SpecWare software (pages 18-19).**

DESCRIPTION	INTERNAL SENSOR	EXTERNAL PORTS	LCD DISPLAY
MODEL 150 ITEM 3612WD	TEMPERATURE RELATIVE HUMIDITY	0	NO
MODEL 130 ITEM 3610TWD	TEMPERATURE LEAF WETNESS	0	NO
MODEL 125 ITEM 3617WD	TEMPERATURE EXTERNAL TEMPERATURE	0	NO
MODEL 120 ITEM 3554WD	RAINFALL	0	NO
MODEL 115 ITEM 3635WD	RAINFALL	1	NO
MODEL 110 ITEM 3618WD	TEMPERATURE	0	NO
MODEL 100 T/RH ITEM 3621WD	TEMPERATURE RELATIVE HUMIDITY	0	NO
MODEL 100 8K ITEM 3620WD	TEMPERATURE	0	NO
MODEL 100 2K ITEM 3619WD	TEMPERATURE	0	NO

WatchDog® 130 Leaf Wetness/Temperature Logger

Mount this pocket-sized WatchDog in your crop canopy for accurate leaf wetness and temperature data. Useful for spray scheduling, pest modeling, and more. Stores up to 8 months of data. **Requires Spec 8 Pro software (pages 18-19)** to create detailed insect and disease probability reports for leaf-wetness-based models.

Item 3610TWD **Leaf Wetness/Temperature Logger**

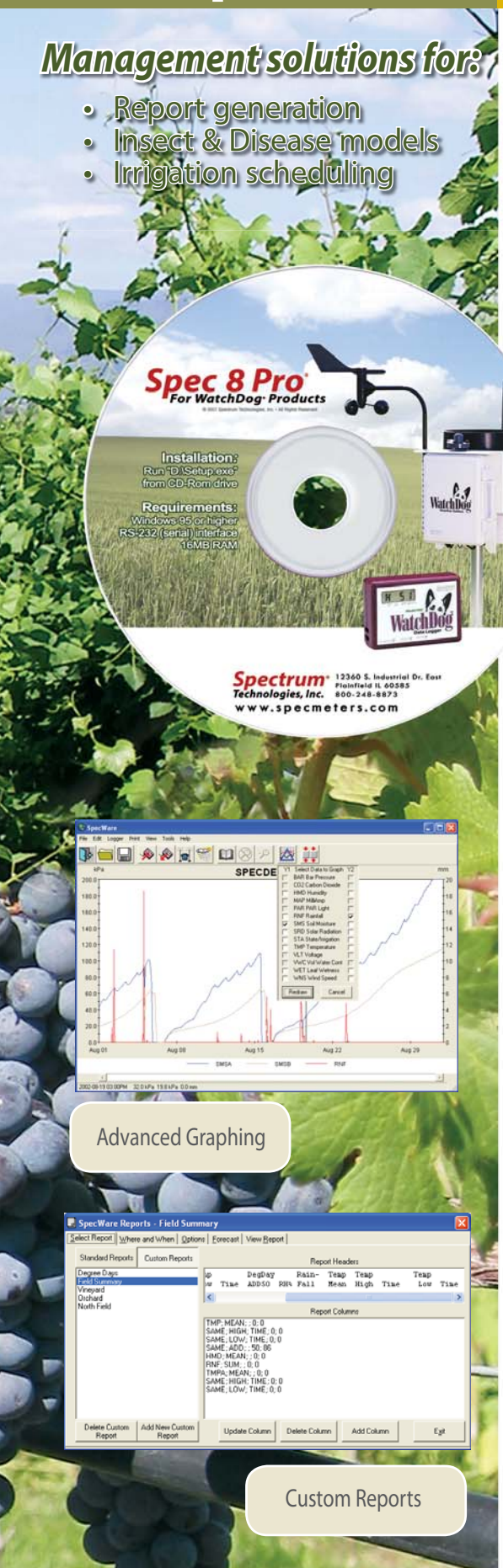
WatchDog® Model 100 Water Resistant Button Loggers

Don't let their small price and size fool you. The WatchDog Model 100 Button Loggers are water resistant, exceptionally affordable, and powerful enough to log 2,000 or 8,000 measurements. They log temperatures ranging from 14° to 185°F/-10° to 85°C with accuracy of ±2°F/±1.1°C and with a battery life of up to 10 years, depending on the logging interval. Water-resistant stainless steel case protects internal sensor and circuitry. Use with SpecWare software and snap-in docking station to download data for analysis and reporting. **Requires SpecWare software (pages 18-19).**

Docking Station:

Item 3655K2
WatchDog Model 100 Button Docking Station

SpecWare® Software & Disease Models



Spec 8 Pro Software

As the latest improvement to Spectrum's AE award winning software, **Spec 8 Pro** delivers crucial information to growers and researchers in an easy-to-use interface. Plot graphs on-the-fly with a simplified interface. Set sensor alarms to call your phone or pager for frost, rainfall, or other conditions. Import data files from more applications. Customize and save your important reports. Spec 8 Pro is a powerful tool for growers, researchers, or other users that need the best data at the right time.

AE50 outstanding innovations
AWARD WINNER
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Spec 8 Pro Features:

- New for 2008: For calibrated sensors, enter the adjustment values, and Spec 8 Pro will apply them before saving the data.
- Graph on-the-fly with an interactive graphing window. X/Y axis mark options simplify data analysis.
- Build, customize, and save your most important report formats or choose from eleven standard reports.
- Add optional insect and disease models to forecast pest pressures and reduce pesticide costs. Produce reports with graphs for each pest.
- Set a frost alarm that will call your mobile phone or pager at frost temperatures or other sensor conditions.
- Automate logger downloads with wireless or directly connected stations. Generate scheduled log files for data-to-web applications or create an XML file that can be posted on the web.
- Find and use data easily with an improved file management system. All logger data is stored in one file per month, simplifying data sharing and exporting.
- International features include handling date, time, and numbers with regional formats, setting English or Spanish language and Metric or US measurements.

Item 3654P Spec 8 Pro Software
Item 3654PXU Spec 8 Pro Extra User License
Item 3654PUP Spec 8 Pro Upgrade

Disease and Insect Models

Become more proactive in the fight against disease and pesky insects by adding a disease and insect forecast module to your Spec 8 Pro software. Save money by spraying only when necessary. Plus, quickly produce the documentation when needed to support your IPM decisions. Each package uses field-tested and validated algorithms along with the data you collect to forecast the potential for the appearance of your crop's most notorious enemies.

Forecast Model Packages

Grape Alert package
Requires leaf wetness, relative humidity and temperature sensors. Includes models for Powdery Mildew (Uncinula necator), Black Rot (Guignardia bidwellii), Downey Mildew (Plasmopara viticola), Botrytis (Botrytis cinerea), Phomopsis Cane Leaf Spot, and insect models. Also enables Powdery Mildew (Uncinula necator) and Black Rot (Guignardia bidwellii) to display on WatchDog 2000 series stations.

Item 3656GA Grape Alert

Apple/Pear Alert package
Requires leaf wetness and temperature sensors. Includes models for Apple Scab (Venturia inaequalis), Fire Blight (Erwinia amylovora), Sooty Blotch (Peltaster fruticola, Leptodotium elatius), Flyspeck (Zygiophiala jamiacacenis), and insect models. Also enables Apple Scab (Venturia inaequalis), Sooty Blotch (Peltaster fruticola, Leptodotium elatius), and Flyspeck (Zygiophiala jamiacacenis) to display on WatchDog 2000 series stations.

Item 3656AP Apple/Pear Alert

Forecast Model Packages (Continued)

Turf Alert package
Requires air and soil temperature, relative humidity, and rain sensors. Includes models for Brown Patch (Rhizoctonia solani), Pythium (Pythium aphanidermatum, Pythium graminicola), Dollar Spot (Sclerotinia homoeocarpa), and insect models.
Item 3656TU **Turf Alert**

Potato Alert package
Requires temperature, relative humidity and rain sensors. Includes models for Early Blight (Alternaria solani), Late Blight (Phytophthora infestans), and insect models.
Item 3656PO **Potato Alert**

Tomato Alert package
Requires leaf wetness and temperature sensors. Includes TOMCAST for Early Blight (Alternaria solani, Septoria lycopersici) and insect models. Also enables TOMCAST (Alternaria solani, Septoria lycopersici) to display on WatchDog 2000 series stations.
Item 3656TO **Tomato Alert**

Cherry Alert package
Requires leaf wetness and temperature sensors. Includes Cherry Leaf Spot (Blumeriella jaapii) and insect models.
Item 3656CH **Cherry Alert**

Spec 8 Basic Software

Spec 8 Basic works with your Data Logger or Station to collect and organize data for analysis

Spec 8 Basic is a major upgrade to Spec Basic, adding the improved graphing, exportable data file format, and international capabilities previously only available to Pro customers.

Spec 8 Basic software lets you easily perform weather data analysis and produce the reports you need. With Spec 8 Basic, you no longer have to waste valuable time exporting the data and performing calculations in tedious spreadsheet programs. The software automatically assigns each WatchDog Weather Station/Data Logger to its own "logger location" directory, which is appended every time you download new data. Spec 8 Basic does not support disease models or the 2000 Series Weather and Mini Stations.

Quickly generate reports for:

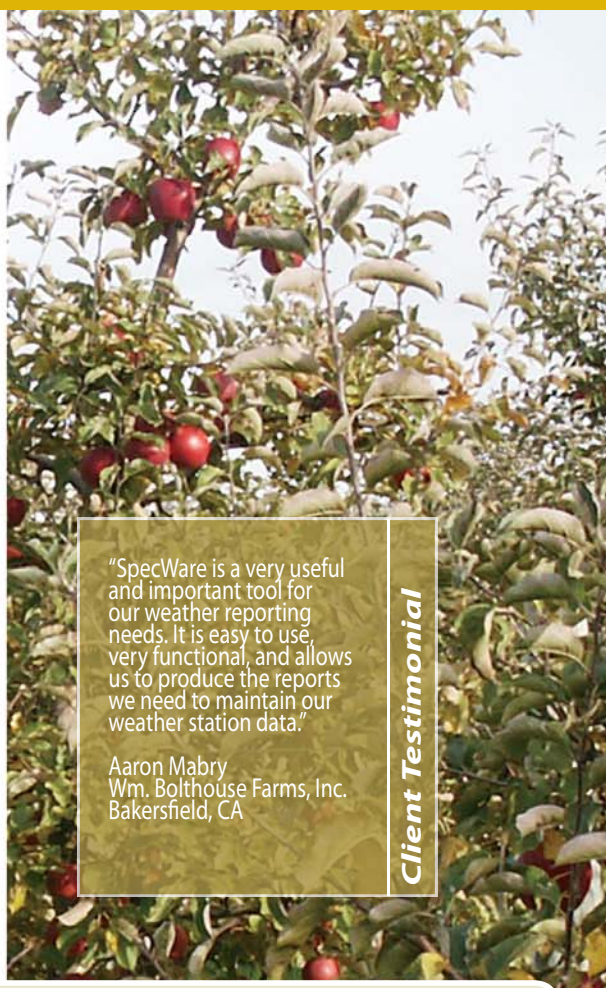
- Soil temperature hours
- Degree days
- Leaf wetness hours
- Daily, monthly and annual summaries
- Light hours
- Chill hours
- Temp/RH hours

Includes: CD, PC interface cable and manual. Requires Windows 95 or later, CD-ROM drive, and one free serial port.

Item 3654B **Spec 8 Basic Software**
Item 3654BXU **Spec 8 Basic Extra User License**
Item 3654BUP **Spec 8 Basic Upgrade**

Connect WatchDog Stations and Loggers to PCs or laptops without a serial port

Item 3661USB **USB-to-Serial Adapter**



Client Testimonial

"SpecWare is a very useful and important tool for our weather reporting needs. It is easy to use, very functional, and allows us to produce the reports we need to maintain our weather station data."

Aaron Mabry
Wm. Bolthouse Farms, Inc.
Bakersfield, CA

Comparing Spec 8 Basic to Spec 8 Pro

	Basic	Pro
View Data		
On-demand graphing	•	•
Manage Data		
Calibration adjustment		•
Automatic data append	•	•
Single file per logger	•	•
International data format	•	•
Log option for web uploads		•
Reports		
Standard reports	•	•
Custom reports		•
Sensor (frost) alarm		•
"Pest Alert" report models		OPT
Communications		
Direct connect or modem	•	•
Wireless capability		•
Dial up modem		•
Auto download		•
Supported Products		
2000 Series Stations		•
Data Loggers: 100/200/400 Series	•	•

IPM Scope, Refractometers & Macroscopes

Management solutions for:

- Plant health
- Pest management

Powerful Scope, Powerful Software

TOP 10 New Products of 2006 World Ag Expo

Your portable digital microscope solution at an affordable price!

The IPM Scope combines a digital camera, precision optics, and LED lighting into a powerful handheld microscope and imaging software package. Zoom in with its versatile 40 or 140X magnification on fine details of plant disease symptoms, insects, or anything else too small to see with the naked eye. Instead of straining to look into a tiny eyepiece, place the IPM Scope over the leaf and view the magnified image right on your computer screen. Capture still images, easily add descriptive labels, make measurements, or even draw right on the image!

The IPM Scope comes with all the software required to capture and archive your still images. The video upgrade bundle can be purchased separately to provide the ability to capture your live videos and time lapse sequences.

The IPM Scope connects to your computer's USB port where it's always ready to use. Take your laptop and the IPM Scope anywhere.

view the online presentation of the IPM Scope at:
http://www.specmeters.com/ipm_scope

IPM Scope Features and Specifications:

Features:

- View live images on the computer screen
- 40 - 140x magnification
- Completely portable with a laptop computer
- Archive still images or send files via e-mail
- Labels, markers, time stamps, and measurement scale
- Draw directly on the live image

Specifications:

Image Sensor: 1/3" CMOS	Pixels: 640 x 480
Power: USB port	Light Source: Super-bright LEDs
Field of View:	Resolution: 4 microns
@40X: 7.5 x 10 mm	
@140X: 1.8 x 2.5 mm	

Item 2860 **IPM Scope**
Item 2860V **Video Software Upgrade**
Item 2860UV **IPM Scope-Ultra Violet**
Item 2860MP **IPM Scope-Mega Pixel**
Item 2860HS **Plastic U-Shims for viewing 3D images (2 x .158cm, .317cm, .635cm)**
Item 2860ST **IPM Scope Stand (3" / 7.62cm tall)**

Macroscope (and accessories)

MACROSCOPE 25 provides 25X magnifications over a wide 8 mm (5/16) field of view. The positionally correct image includes an interchangeable scale. The A scale provides measurements in inches and millimeters and the B scale provides measurements in inches and mills. With the close-up lens removed the unit can be used for distance viewing.

MACROSCOPE 45 provides 45X magnification over a wide 4.8mm (3/16) field of view. It incorporates a measuring scale providing measurements in inches or millimeters. With the close-up lens removed the unit can be used for distance viewing.

An optional A/C powered light table is available for viewing under a wider variety of conditions. A camera adapter ring is also available for use when permanent records may be desirable. Camera adapter designed for 52mm thread, and 35mm reflex lens cameras. Adapt to other cameras with stepping rings.

Item 2851 **Macroscope 25 with hard protective carrying case**
Item 2852 **Macroscope 45 with hard protective carrying case**
Item 2856 **Macrolite Table 1 with A/C Adapter**

Digital Refractometer

This compact refractometer offers Brix measurement from 0 to 53.0% with ± 0.2% accuracy. The small sensor area allows measurement of minute samples. Automatic temperature compensation and a large digital display assure you get exact readings every time. Measurements display within seconds. Maintenance is easy - calibrate in seconds, rinse/wipe sample area with water. Operates on two "AAA" batteries.

Item 2812 **Digital Refractometer**

Handheld Refractometers for Field or Lab

Easily calibrated refractometers measure from 0 to 32% Brix with ±0.5% accuracy, with or without automatic temperature compensation. Sturdy, handheld instruments are valuable in determining Brix percentages. Simply place one or two drops of fruit or vegetable juice on the scale, then read the results in Brix through the shaded area on the eyepiece. Includes case and instructions.

Item 2801 **Refractometer 0–32% Brix**

Item 2806 **Refractometer 0–32% Auto Temp. Comp.**

WatchDog®

WeatherTrackers

No Computer Needed

Management solutions for:

- Degree-day tracking
- Chill-hour calculators
- Disease forecasting
- DLI/DIF temperatures

AE50 outstanding innovations
AWARD WINNER
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WatchDog WeatherTrackers record and display conditions in your orchard, vineyard or greenhouse that can alert you to insect and plant disease pressure. You have significant investment in your crop and can't afford losing fruit quality or yield. That's why an affordable, user-friendly WeatherTracker – measuring conditions specific to your crop – makes sense for you. If you save one fungicide spray, you have probably paid for your WeatherTracker and put money in your pocket. Values are calculated based on sensor readings every 15 minutes. Put this award-winning product to work for you. Order today!

Degree days – Program up to three degree-day memories and one chill-hour memory. The WeatherTracker's solar radiation shield and 15-minute degree-day data point interval results in exceptionally accurate degree-day calculation.

Built-in Data Logger – Store your events in fail-safe, non-volatile memory. You can even replace the batteries without losing valuable weather data. Your WeatherTracker has enough memory for a complete growing season and then some.

LCD display – Displays the current conditions in addition to the daily high/low temperature readings, degree days, leaf wetness hours*, disease pressure*. (DLI/DIF Daily Light Integral and DIF temperature aid in growing greenhouse plants) You can recall the last 30 days of detail data, as well as 12 months of summaries. Current readings are updated every 15 seconds.

*on applicable models.

Battery powered – an 8-month battery power source (9 volt battery included) means no solar panels to purchase or maintain.

Choose the Model **Right for You**

Item #	Model #	Air Temp	Soil Temp	Quantum Light	Leaf Wetness	Disease Forecast
Degree Day Tracker						
3500	300	Yes	No	No	No	No
Greenhouse Growth Tracker						
3501PAR	305	Yes	No	Yes	No	No
Air/Soil Temperature Tracker						
3502	310	Yes	Yes	No	No	No
Pest Disease Trackers						
Apple/Pear Pest Alert						
3504	320	Yes	No	No	Yes	Apple Scab
Vegetable Pest Alert						
3508	325	Yes	No	No	Yes	TomCast
Grape Pest Alert						
3512	330	Yes	No	No	Yes	Powdery Mildew

Frost Alarms

Management solutions for:

- Frost protection

WatchDog® Frost Alert

Spot frost conditions easily in your vineyard or orchard with the WatchDog Frost Alert. The Frost Alert saves time and labor compared to other monitoring methods. When the temperature approaches freezing, the high-powered LED light (visible from about two miles) changes color and flash frequency to indicate temperature conditions at-a-glance. The Frost Alert will shut off above 37ºF/2.8ºC to conserve power. Requires 6 volt lantern battery (not included).

Item 3430 **WatchDog Frost Alert**

Frost Alert alarm colors

Green – Above 34ºF/1ºC

White – 32º to 34ºF/0-1ºC

Red – Below 32ºF/0c
Flashing Red – Below 30ºF/ºC

WatchDog® Wireless Crop Monitor

The WatchDog Wireless Crop Monitor measures and transmits temperature data via wireless technology. The wireless sensing units can be installed anywhere within a 1,000ft/300m radius from the local base monitoring unit. Adding additional sensing units couldn't be easier. Once installed, the units work together to keep you on top of environmental conditions. In case of over-temperature or under-temperature conditions, the alarm sounds and an indicator notifies you of the abnormal condition.

Item 3545 **WatchDog Wireless Crop Monitor -Temp**
Includes: (1) Base Unit & (1) Remote Unit (Temp)

Item 3546 **WatchDog Remote Temp Unit**

Item 3663WCM **WatchDog Radiation Shield (required)**

ThermAlarm III with Auto Dialer

The Thermalarm III uses hermetically sealed magnetic switches to trigger an alarm condition, eliminating concerns with corrosion and particle contamination of the contacts. This feature is of particular importance in applications where pesticides, high humidity and airborne dust and dirt particles are present. The AutoDialer dials up to four phone numbers with a pre-recorded message when actuated by opened or closed circuit. Auto Dialer runs on battery (not included). AC Adapter sold separately and requires 110V power source.

Item 3424 **ThermAlarm III**
Item 3419 **AutoDialer**
Item 3419AC **AC Adapter**

WatchDog® Sprayer Station

Management solutions for:

- Pesticide drift

WatchDog® Sprayer Station

Effective management of pesticide drift is increasingly important to pesticide applicators. Now you can monitor and data log weather conditions with the new ultrasonic WatchDog Sprayer Station. Accurate data helps pesticide applicators make important decisions regarding weather conditions that affect safety, drift, and proper pesticide application.

Smaller than a can of soda, this all-in-one weather station measures air temperature, humidity, dew point, wind chill, barometric pressure, and apparent wind speed and direction. It handles adverse conditions with a UV stabilized, compact housing that is fully waterproof and resistant to chemicals. Reliability is enhanced by eliminating moving parts: the traditional wind vane and cups have been replaced with ultrasonic transducers.

The WatchDog Sprayer Station is more than a compact and capable weather station. While on-the-go, the station uses its internal compass and GPS to adjust the wind sensor values by subtracting the vehicle speed and direction to compute the true wind speed and direction.

Display current conditions: wind speed & direction, temperature, humidity, barometric pressure, and GPS parameters (vehicle speed & direction, location, and satellite signal strength). Continuously log your weather parameters at a user-selectable rate or hit the snapshot button to capture current conditions.

Sprayer Station Console

The WatchDog Sprayer Station package includes the sensor unit with magnetic mount, CD with display/logging program for use on a Pocket PC/Windows Mobile PDA, 21ft/7m cable with vehicle power and serial connectors.

Item 3349SS **WatchDog Sprayer Station**
Requires Windows Mobile PDA, Windows Laptop, or Viper Pro

Item 3349SSC **WatchDog Sprayer Station with Console**
Console displays & logs conditions and downloads them to your PC

Item 3349CN **WatchDog Sprayer Station Console**

SPECIFICATIONS

Wind Speed Range	0.6 to 114 mph (1 to 184 km/h)
Wind Speed Resolution	0.1 mph (0.2 km/h)
Wind Speed Accuracy	±1.1 mph (±1.9 km/h) or ±4% @ 32-122°F (0-50°C)
Wind Direction Resolution	1°
Wind Direction Accuracy	±1.5° above 32°F (0°C)
Operating Temperature	-22° to 122°F (-30° to 50°C)
Temperature Accuracy	±2.7°F (±1.5°C) with wind above 2.3 mph (3.7 km/h)
Relative Humidity Range	10 to 95%
Relative Humidity Accuracy	±5% with wind above 2.3 mph (3.7 km/h)
Barometric Pressure Range	25 to 34 in-Hg (850 to 1150 hPa/mb)
Barometric Pressure Accuracy	±1.5%
Power Supply Voltage	10 to 16 VDC

WatchDog Sprayer System Sensors:

- Apparent Wind Speed and Direction
- GPS: Course and Speed
- True Wind Speed and Direction (computed)
- Air Temperature
- Relative Humidity
- Dew Point (computed)
- Barometric Pressure

Operating Principle

The WatchDog Sprayer Station contains four ultrasonic transducers which operate in pairs – one injects a pulse into the air, and the one directly opposite it listens for the arrival of that pulse. When there is no wind, the pulse travels at the speed of sound from the sender to the receiver. When the wind is traveling in that direction, the pulse arrives sooner, and similarly if the pulse is traveling against the wind, the pulse arrives later. The four transducers take turns sending and receiving, and a built-in microprocessor combines the four measurements once each second to calculate the wind speed and direction. By checking the GPS, the vehicle speed and direction is subtracted, and the true wind speed and direction computed.

Field Scout® Light Meters

Management solutions for:

- Light measurement

FIELDSCOUT®

Field Scout® Red/Far Red Meter

Plants use the Red/Far Red light ratio to determine how crowded they are, and grow tall or full accordingly. Previously, Red/Far Red measurement required expensive spectroradiometers or sensors, and post-measurement computation. The Field Scout meter displays the Red/Far Red ratio on the LCD screen, and with the push of a button, the 660nm and 730nm readings. 9 volt battery included.

Item 3412 **Field Scout Red/Far Red Meter**

Field Scout® UV Meter

Monitor critical UV radiation (250-400nm) with this handheld meter. Particularly useful for determining UV filtering capacity of greenhouse shades and glass barriers. Range is 0-200.0 µmol m^{-2} s^{-1} (full sunlight). 9 volt battery included.

Item 3414F **Field Scout UV Meter**

Field Scout® Quantum Light Meters

Measure light used for plant growth. This handheld quantum meter measures photosynthetically active radiation (PAR) from 400-700nm, with a range of 0-2000 µmol m^{-2} s^{-1}. PAR is a more valuable measurement than Foot-Candles as it measures only the light used by plants for photosynthesis. Available in a variety of configurations for your convenience. 9 volt battery included.

Item 3415F **Field Scout Quantum Meter**
Item 3415FSE **Field Scout Dual Solar/Electric Quantum Meter**
Item 3415FXSE **Field Scout Dual Solar/Electric Quantum Meter - External Sensor**
Item 3415FQF **Field Scout Quantum and Foot-Candle Meter**

Field Scout® Foot-Candle Meter

This affordable light measurement solution displays immediate light level in terms of Foot-Candles. Precision photo diode with cosine correction. 9 volt battery included.

Item 3413F **Field Scout Foot-Candle Meter**

Field Scout® External Light Sensor Meter

This light meter can read any of Spectrum's light sensors, which come with 6ft/2m cables. Just plug in a sensor, choose it on the LCD display, and start measuring UV, Quantum Light, or Solar Radiation. Sensors can also be used with WatchDog Weather Stations and Data Loggers. 9 volt battery included.

Item 3415FX **Field Scout External Light Sensor Meter**

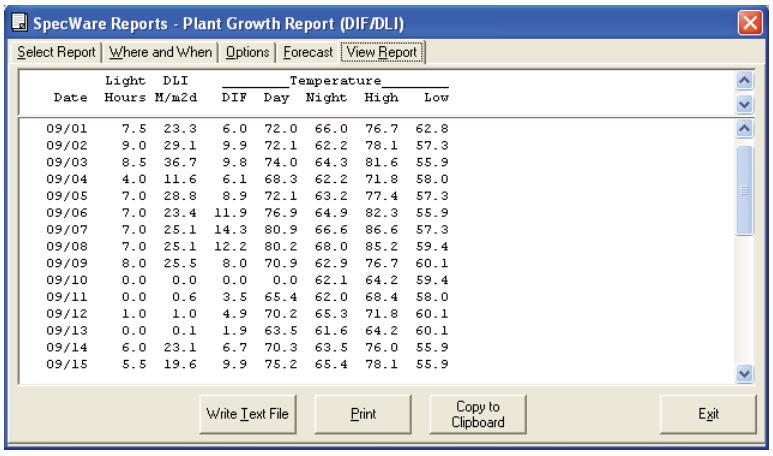
Light sensors sold separately:

Item 3668I **Quantum Light Sensor**
Item 3668I3 **Quantum Light 3 Sensor Bar**
Item 3668I6 **Quantum Light 6 Sensor Bar**
Item 3670I **Silicon Pyranometer Sensor**
Item 3676I **UV Sensor**
(see page 11 for product descriptions)

WatchDog® Model 2475 Plant Growth Station

Light intensity, DLI, average temperatures, degree days, and more! The Plant Growth Station monitors and records temperature, humidity, and light conditions anywhere in your greenhouse. Easily check current and up to twelve months of historical data on the LCD display. Calculate Daily Light Integral and compare to university guidelines (from your extension or at www.specmeters.com) to adjust your shade and light hours. **Requires Spec 8 Pro software.**

Item 3686WD **WatchDog Model 2475 Plant Growth Station**


SpecWare Reports - Plant Growth Report (DIF/DLI)

Select Report | Where and When | Options | Forecast | View Report

Date	Light Hours	DLI M/m2d	DIF	Temperature Day	Night	High	Low
09/01	7.5	23.3	6.0	72.0	66.0	76.7	62.8
09/02	9.0	29.1	9.9	72.1	62.2	78.1	57.3
09/03	8.5	36.7	9.8	74.0	64.3	81.6	55.9
09/04	4.0	11.6	6.1	68.3	62.2	71.8	58.0
09/05	7.0	28.8	8.9	72.1	63.2	77.4	57.3
09/06	7.0	23.4	11.9	76.9	64.9	82.3	55.9
09/07	7.0	25.1	14.3	80.9	66.6	86.6	57.3
09/08	7.0	25.1	12.2	80.2	68.0	85.2	59.4
09/09	8.0	25.5	8.0	70.9	62.9	76.7	60.1
09/10	0.0	0.0	0.0	0.0	62.1	64.2	59.4
09/11	0.0	0.6	3.5	65.4	62.0	68.4	58.0
09/12	1.0	1.0	4.9	70.2	65.3	71.8	60.1
09/13	0.0	0.1	1.9	63.5	61.6	64.2	60.1
09/14	6.0	23.1	6.7	70.3	63.5	76.0	55.9
09/15	5.5	19.6	9.9	75.2	65.4	78.1	55.9

Write Text File | Print | Copy to Clipboard | Exit

WatchDog® WeatherTracker - *No Computer Needed*
Model 305 Greenhouse Growth Tracker

Keep tabs on the conditions affecting your plants with the Greenhouse Growth Tracker. It includes a temperature sensor for tracking degree-days, and a quantum light sensor to measure your plants' light exposure over time (in moles/day).
The 305 is a comprehensive tool to assess physiological maturity of your plants.

- Stand-alone device – see important information on the LCD screen – without a PC!
- One-button review of 30 days of values and 12 months of summaries.
- LCD display (updates every 20 seconds) with easy-to-use keypad.
- 9 v battery with 8-month life; memory protection in case of power loss.

Item 3501PAR **WeatherTracker Model 305 Greenhouse Growth**

Weather

Rain Gauges & Hand-Held Wind Meters

Hand-held management solutions for:

- Weather monitoring
- Temperature and humidity

Digital Tipping Bucket Rain Gauge

Provides NWS accuracy with a self-emptying design

Mount this 8in/20cm diameter freeze-resistant collector outside and record rainfall with NWS statistical accuracy. Every time bucket empties, the battery-operated counter sends a count to the indoor console. Automatically records and displays up to 9.99in/25cm of rain. Reset button lets you clear to zero. Easy, plug-in installation. Includes long-life lithium battery and 60ft/18m of cable.

Item 3525R **Digital Tipping Bucket Rain Gauge - Inches**
Item 3525M **Digital Tipping Bucket Rain Gauge - Metric**

Wireless Rain Collector With Temperature

This rain collection cannister is self-emptying and provides cumulative and daily precipitation totals for up to nine days–all without any wiring whatsoever! Long range capability allows the collector to be placed up to 300ft/900m from the main unit. Includes indoor and wireless outdoor thermometers and rain alarm. Easy-view LCD console displays inches/millimeters rainfall.

Item 3526WT **Wireless Rain Collector with Temperature**

Pocket-Sized T/RH Pen

Get accurate temp and humidity readings fast. It's small enough for a pocket, but big on accuracy! The T/RH Pen measures temperatures from 14°- 122°F/-10° - 5°C with ±2° accuracy and relative humidity from 5% to 95% with ±5% RH accuracy. Features °F or °C scales, min./max. memory, simple touchpad controls and digital readout. Batteries included.

Item 3409 **Pocket-Sized T/RH Pen**

Dew Point/Temp/RH Meter

With an efficient side-by-side display, the portable Dew Point/Temp/RH Meter reveals critical temperature and humidity readings – typically in just 80 seconds! Separate electronic circuits provide true temperature-compensated readings for added reliability. Features min./max. memory, auto power off, °F or °C switch and data hold. Temperature range from 14° - 122°F/-10° - 5°C with ±2° with ±1.8° accuracy. RH accuracy ±3% within 10–90% RH; ±4% all other ranges. Includes two "AAA" batteries.

Item 3411 Dew Point/Temp/RH Meter
Item 3411WB Digital Sling Psychrometer w/ Wet Bulb/Dry Bulb Temps

Crop TRAK Mini IR Thermometer

Measures temperature from -58° to 1,000°F/-50° to 538°C with 0.1° resolution up to 199.9°. Use the built-in laser pointer to identify your target area. Backlit LCD display. Features also include overrange indicator and Automatic Data Hold when trigger released. 8:1 distance to target ratio. Accuracy: ±2% of reading or 4°F/2°C whichever is greater, from 64° to 82°F/18° to 28°C. Comes with a 3 year warranty. Battery included.

Item 2955LCT Crop TRAK Mini IR Thermometer

Digital Thermo Wind Meter

Field tough accuracy and detects even the lightest winds. Essential for pesticide applicators, this compact wind and temperature meter provides digital accuracy to ±3% in the field. Tough and affordable, the Mini Thermo Wind Meter measures MPH, M/S, KM/H, knots, FPM, average/maximum speed and temperatures up to 122°F/50°C. Temperature accuracy: ±1.8°F/1°C. C/F switchable with min/max speed of 1.1-62.5mph/1.7-100.6kph. Waterproof, flotational design. Features auto power off and field-replaceable propeller. Includes 400-hour CR2032 battery, lanyard and protective case. Also available with Relative Humidity sensor (accuracy ±4%).

Item 3149 Mini Thermo Wind Meter
Item 3145 Mini Thermo/RH Wind Meter

SpecMaps® Web Mapping Utility

SpecMaps™

Make management decisions based on your field's spatial variability!

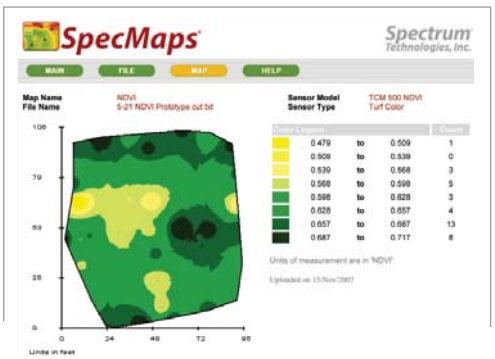
Get maximum value out of your portable Field Scout meters by using SpecMaps, Spectrum's web mapping utility, to produce colorful, 2-dimensional maps from your data. SpecMaps allows you to easily upload geo-referenced data files from any Field Scout meter to our specially designed, web-based software.

Statistical interpolation is used to create charts that give you and your clients an instant visual picture of the spatial variability across the landscape. Data is archived at the server so your maps can be easily accessed from any computer with access to the internet. Monitor localized dry spots on a golf green, compacted zones on a soybean field, or nitrogen-deficient sections of your vineyard. SpecMaps is your edge in effective crop and soil management.

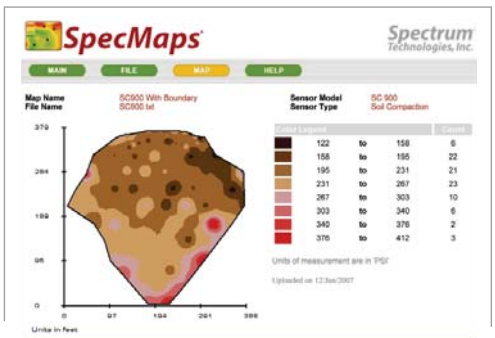
Compatible Spectrum Field Scout and SPAD Products:

- SPAD 502DL
- Field Scout CM 1000
- Field Scout TCM 500
- Field Scout pH 110
- Field Scout EC 110
- Field Scout SC 900
- Field Scout TDR 300

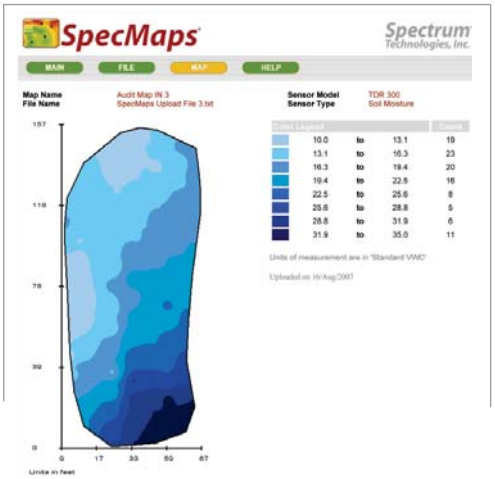
TCM 500 on a lawn: Dark green areas represent healthy turf grass.



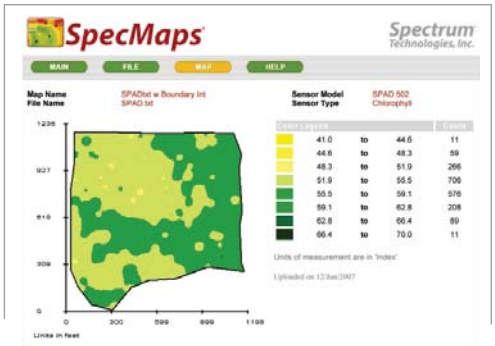
SC 900 on a baseball field: Yellow and red spots indicate areas of heavier soil compaction.



TDR 300 on a putting green: The areas with higher soil moisture are shown in deep blue.



SPAD 502 measuring nitrogen content in corn: Dark green areas indicate higher chlorophyll content.



Item 3652 **SpecMaps Web Mapping Utility (1-Year Subscription)**

SPAD 502 with Data Logger

Management solutions for:

- Yield-limiting crop deficiencies
- Nitrogen and chlorophyll monitoring
- Over-fertilizing prevention

SPAD 502 Chlorophyll Meter

SPAD 502 Chlorophyll Meter quantifies the health of your crops

The SPAD 502 Chlorophyll Meter instantly measures chlorophyll content or "greenness" of your plants to reduce the risk of yield-limiting deficiencies or costly overfertilizing. The SPAD 502 quantifies subtle changes or trends in plant health long before they're visible to the human eye. Non-invasive measurement; simply clamp the meter over leafy tissue, and receive an indexed chlorophyll content reading (0-99.9) in less than 2 seconds. Assess nitrogen needs by comparing in-field SPAD readings to university guidelines (available at www.specmeters.com) or adequately fertilized check or reference strips. Research shows a strong correlation between SPAD measurements and leaf N content.

Item 2900 **Minolta SPAD 502 Chlorophyll Meter**

SPECIFICATIONS FOR SPAD 502

Optical Density Difference at two wavelengths: 650 nm and 940 nm
Measurement Area: 2 mm x 3 mm (Approximately $^{3}/_{32}$" x $^{1}/_{8}$")
Light Source: 2 LEDs
Receptor: Silicon Photodiode
Data Memory: Space for 30 data points
Power Source: 2 "AA" alkaline batteries (1.5V)
Repeatability: Within ±0.3 SPAD unit
SPAD Value: Index of relative chlorophyll content; 0.0 to 99.9

SPAD 502DL Chlorophyll Meter SpecMaps

This model includes a built-in data logger so you can compile SPAD readings for statistical analysis. Also includes an RS-232 port for communicating with a PC and/or portable GPS receiver. Use geo-referenced data to correlate N measurements to yield maps or download the data into mapping software. This robust field-data collection device has a capacity of 1,488 measurements when coupled with a GPS receiver or 4,096 measurements when used without GPS. Requires software running on Windows 3.1 or higher. GPS/DGPS cable required for geo-referenced operation. Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping software requires GPS; not included.**

Item 2900DL **Minolta SPAD 502 Chlorophyll Meter**
with RS-232 Data Port and Built-In Data Logger (includes software)

Item 2900DLUP **Upgrade Field Units**
to include data logger, RS-232 port and software

Item 2950CV5 **GPS/DGPS Cable**

Field Scout® CM 1000 Chlorophyll Meter

MEASUREMENT Innovations

AE50 outstanding innovations
AWARD WINNER FOR TECHNOLOGY INNOVATION

The importance of measuring chlorophyll

Chlorophyll absorbs sunlight and uses its energy to synthesize carbohydrates from CO_2 and water. This process is known as photosynthesis and is the basis for sustaining the life processes of all plants. Nitrogen (N) is a key element in the chlorophyll molecule that enhances photosynthesis. Hence, chlorophyll can be used as an index to gauge the nitrogen status of a plant. An alternative to a time-consuming and expensive laboratory test for chlorophyll is using a chlorophyll meter that measures relative "greenness" of the plant by either light transmittance/absorbance (SPAD 502, page 31) or reflectance (CM 1000).

FIELDSCOUT®

CM 1000 Chlorophyll Meter

SpecMaps™

Detect stress earlier than visual monitoring for healthier plant growth. Based on an exclusive patent license from NASA, the Field Scout CM 1000 Chlorophyll Meter uses "point-and-shoot" technology to instantly tell you relative chlorophyll content. At 12in/30cm, it integrates a large 1.5in/4cm diameter area on a plant leaf or, at 4ft/1.2m, a 4.5in/11cm diameter spot on turf grass. Laser guides outline the edges of the measured sample area of leaf or canopy. An ambient light sensor automatically corrects measurements for varying light conditions. The handheld meter calculates and displays a running average for multiple readings while simultaneously recording each sample in the built-in data logger for detailed analysis later at your PC. Data logger can function with or without GPS/DGPS. Durable and highly portable, the Field Scout Chlorophyll Meter is an essential tool for more effectively managing your nitrogen program. Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping program requires GPS; not included.**

Item 2950 **Field Scout CM 1000 Chlorophyll Meter**
Item 2950S **Software To Activate Data Logger** (includes PC cable)
Item 2950CV5 **GPS/DGPS Cable**

SPECIFICATIONS FOR FIELD SCOUT® CM-1000

Measurement Sample: Plant leaves, turf grass canopy

Measurement System: Reflectance; Ambient and reflected 700 nm and 840 nm light are used to calculate the relative chlorophyll index

Measurement Area: Conical viewing area between 30 and 183 cm

Minimum Distance: 12 inches (30.5 cm) from lens

Maximum Distance: Accuracy is unknown beyond 183 cm from lens

Distance From Lens:	Sample Area (Diameter):
12 in. (30.5 cm)	0.53 in. (1.35 cm)
18 in. (45.7 cm)	1.21 in. (3.07 cm)
48 in. (1.22 m)	4.65 in. (11.8 cm)

Receptor: (4) photodiodes; (2) for ambient light and (2) for reflected light from the sample (leaf)

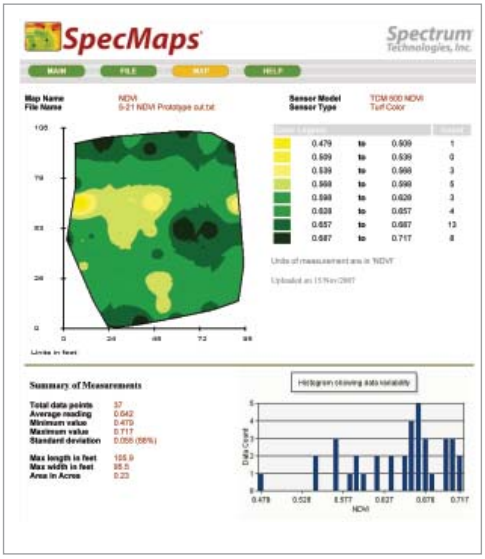
Measurement Units: Index of relative chlorophyll content; 0 to 999

Measurement Interval: 2 seconds per measurement

Repeatability: ±5% of reading

Data Logger: Requires software and PC interface cable; Capacity: 1,350 measurements with GPS/DGPS; 3,250 measurements without GPS/DGPS; nonvolatile memory

Battery/Life: 2 "AAA" batteries (included); approx. 3,000 measurements



Field Scout® TCM 500 NDVI Meter

Management solutions for:

- Turf quality

Field Scout® TCM 500 NDVI Turf Color Meter

SpecMaps™

Turfgrass quality is visually evaluated by human assessors based on a scale of 1 (the grass is dead) to 9 (the grass is of outstanding quality) in the current assessment method. This evaluation practice has several disadvantages and therefore, there is the need for a better evaluation technique. Individual biases are inevitable and lead to some level of inconsistency, even among the most highly trained observers.

The Field Scout TCM 500 NDVI Turf Color Meter measures reflected light from turf grass in the red (660nm) and near infrared (850nm) spectral bands. Research from Clemson University, "Predicting Visual Quality Ratings of Turfgrass Research Plots Using Spectral Reflectance"(Muharrem, Keskin, Roy B. Dodd, Young J. Han, Ahmad Khalilian - Paper # 031114, ASAE 2003 Annual Meeting) is the basis for the technology used in this meter.

Since chlorophyll absorbs the red band (660nm) of incoming radiation, the reflectance is relatively low due to the strong absorption of the light by the plant pigments. The high reflectance in the near infared (850nm) band is caused by the cellular structure of the plant leaves particularly the spongy mesophyll leaf structure.

- Red & NIR values are presented in three modes: as an index (0 to 99) of Red/NIR in %, NDVI, and Grass Index (ie. 7.3).

$$NDVI = \frac{NIR - Red}{NIR + Red}$$

Where:
NDVI = Normalized Difference Vegetation Index
NIR = reflectance in the band of 850 ± 5 nm
Red = reflectance in the band of 660 ± 5 nm

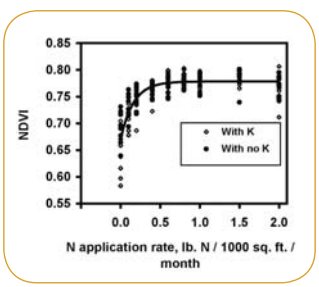


Figure 1. Normalized difference vegetation index measurements in relation to nitrogen application rate for a creeping bentgrass turf.

(n = 162, p < 0.0001, pseudo-R^2 = 0.714). Plateau NDVI value is 0.78. Potassium treatment (K) is either 0 or 2 lb K2O eq. / 1000 sq. ft. / month (97.8 kg K2O eq. / ha / mo).

Observations are pooled across three sample dates of established turf. UConn – Dr. Karl Guillard, Dr. Salvatore Mangiafico.

Note: The TCM 500 NDVI generates both an NDVI value and a grass color index (GCI). A 0.78 NDVI value would correlate to a GCI of 7.4.

Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping program requires GPS; not included.**

Item 2975NDVI	**Field Scout TCM 500 NDVI Turf Color Meter**
Item 2975H	**Field Scout TCM 500 T-Handle**
Item 2950CV5	**GPS/DGPS Cable**

SpecMaps™

Discover the value of spatially variable sensor measurements with SpecMaps Web Mapping and a user-provided GPS unit. See page 30 for additional information

Item 3652	**SpecMaps Web Mapping Utility (1-Year Subscription)**

NEW! Irrigation "Soil Moisture" Audit

NEW Method:

FIELDSCOUT®
TDR 300 SOIL MOISTURE METER

The Field Scout TDR 300 is your tool when precision irrigation decisions count and to eliminate the guesswork!

Based on proven time-domain measurement technology, these portable units accurately measure soil moisture across the full range of soil moisture conditions. The Field Scout TDR 300 Soil Moisture Meter gives you the flexibility to measure the soil moisture content directly, anywhere in the field. With the internal data logger connected to a user-supplied GPS receiver, the TDR 300 captures geo-referenced data that can be readily imported into our spatial mapping software for full analysis over the Internet.

1) Measure

Connect the TDR 300 to an active user-provided GPS receiver. Start collecting your data points along the boundary of the site at 5-step intervals. Once the boundary is set, sample the interior following a grid pattern.

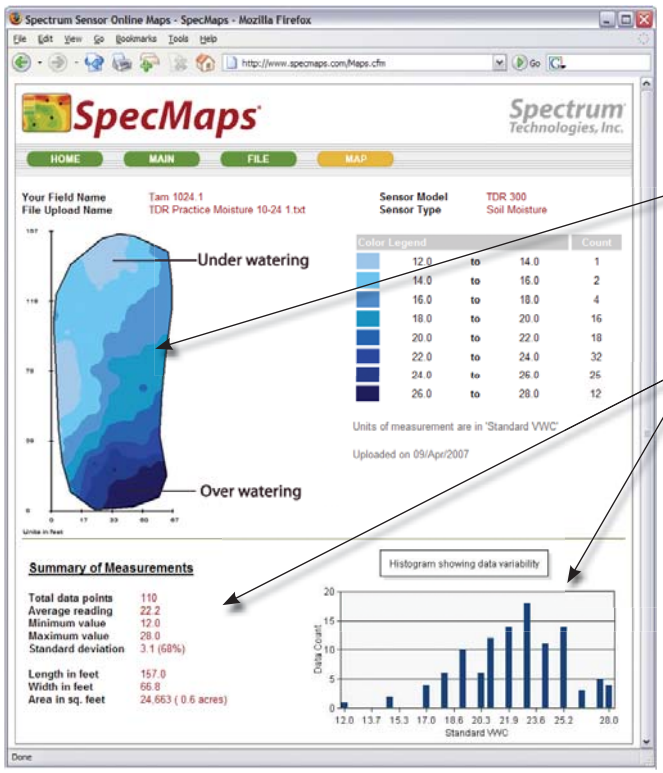
2) Process Your Data

The TDR 300 connects directly to your PC via the data port on the meter. Field Scout® software allows you to download your collected data.

SpecMaps™

The combination of the TDR 300, GPS and SpecMaps is the NEW method for collecting accurate irrigation data.

SpecMaps™ web-based software provides a simple tool for turning your TDR 300 measurements into a 2-dimensional color map of soil moisture variability. The location and relative magnitude of wet and dry spots becomes immediately apparent. SpecMaps also displays statistical information about your field or golf green, including a histogram for another quick assessment of how uniformly moisture is distributed across the field.



3) Analyze Your Results

Log onto the SpecMaps website. Upload your stored data file and name your map for easy future reference.

Plot your data points alone or create a 2-dimensional contour map
The chart consists of the contour or the data point map. This map is accompanied by a legend that relates the colors in the map to the soil moisture values. With a few clicks of your mouse, see exactly where your site is being over watered or is in need of irrigation.

The measurement summary
Includes some basic statistical information about the data set as well as a histogram for visualizing the complete soil moisture data range.

The new process is designed to be fast, easy, and accurate. No need for tedious set-up, testing, and re-testing for your results. Get your answers on the spot with true root zone moisture information. You are able to see the complete picture of your turf's irrigation profile in full color and without the need of tiny cups or hand-drawn charts.

Your irrigation audit, simplified…
by Spectrum Technologies.

815.436.4440 • www.specmeters.com

Traditional Method:

Limitations of a traditional irrigation audit:

The traditional process of collecting irrigation data is time consuming: setting up catch cans, drawing out diagrams, and waiting for the watering cycle to be completed. Re-testing areas and going through the whole process again is tedious and not very flexible. Lastly, the traditional audit only measures the water applied but gives no information from the root zone.

The spatial distribution efficiency of a sprinkler system can be checked for uniformity by means of surface collection vessels. However, this does not indicate how the moisture distributes itself in the soil (or, indeed, if it infiltrates at all). Without the information from the root zone, the data is not accurate in showing the full picture of the soil moisture profile.

See the charts below to compare the two methods of data collection

	Traditional Audit	TDR 300 / SpecMaps System
Measures water delivery at the turf level	✔	
Measures water delivery at the root zone level		✔
Irrigation system needs to be running when conducting tests	✔	
Pre-testing set up and post-testing clean up	✔	
Spot testing while walking the site		✔
Measurable water retention of soil throughout the site		✔
Geo-referenced GPS information		✔
Exportable data for analysis		✔
Automated visual analysis of data		✔
Access to data over the Internet		✔
Data stored and backed up on secure server		✔

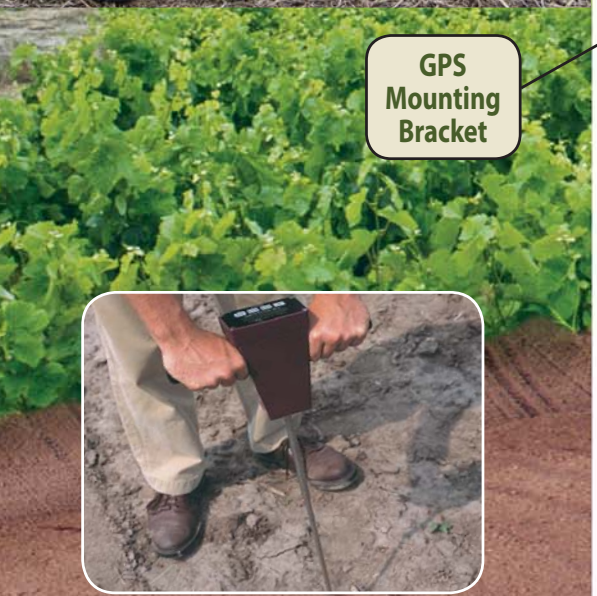
A study out of Colorado (Mecham, 2001) demonstrated that the lower quartile distribution uniformity (DU_{LQ}) measured by catch cans does not always reflect how moisture is distributed in the soil (columns B and D). The amount of water applied to the turf was determined by either evapotranspiration (ET) or by buried soil moisture sensors. The difference between the two uniformity coefficients is due to the fact that water redistributes itself once it enters the soil profile. Therefore, computing irrigation requirements based on catch-can uniformity can lead to excess water being applied to the soil as can be seen by the corresponding calculated irrigation requirement (columns C and E).

Comparing similar sprinkler zones, same soil type, different data collection methods:

	CATCH CANS		SOIL MOISTURE	
A: Irrigation Schedule	B: DU_{LQ}	C: Irrigation Requirement	D: DU_{LQ}	E: Irrigation Requirement
Daily over-watering	72%	3.03cm	93%	2.72cm
Twice per week @ ET	68%	3.73cm	87%	2.92cm
Daily @ > ET	73%	3.63cm	90%	3.05cm
Daily @ < ET	55%	3.48cm	77%	2.82cm
Soil Moisture Sensor	70%	4.62cm	83%	3.30cm

Mecham, Brent. 2001. Distribution Uniformity Results Comparing Catch-Can Tests and Soil Moisture Sensor Measurements in Turfgrass Irrigation. Proceedings, Irrigation Association's 2001 International Irrigation Show, San Antonio, TX, Nov. 2001, pp. 133-139

Field Scout® SC 900 Meter



Management solutions for:

- Precision farming
- Soil compaction detection and monitoring

Field Scout® SC 900 Soil Compaction Meter

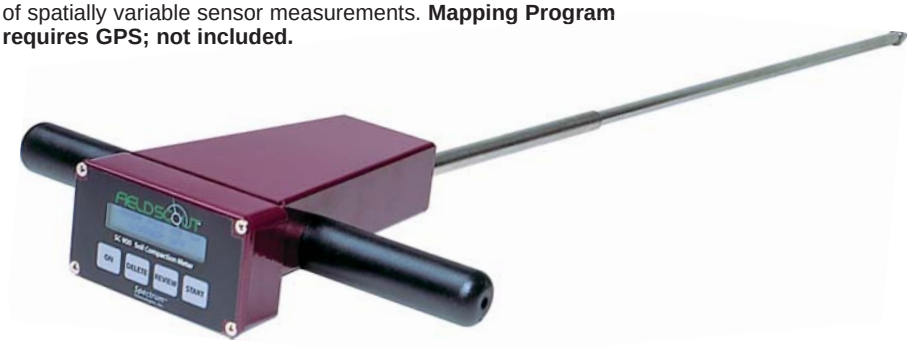
SpecMaps™

Improve your yield potential by locating and monitoring soil compaction problems. An exclusive ultrasonic depth sensor provides soil depth readings in 1in/2.5cm increments as the load cell measures the penetration resistance. Compaction data is displayed in PSI or kPa.

With a data logger and RS-232 port built right in, the SC 900 enables you to make geo-referenced soil compaction measurements for correlation with yield maps. Use with a backpack DGPS and analyze overall soil compaction field data.

Special software (included) allows you to download data for use in spreadsheet maps, change logger settings, and otherwise configure the meter to your application.

Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping Program requires GPS; not included.**

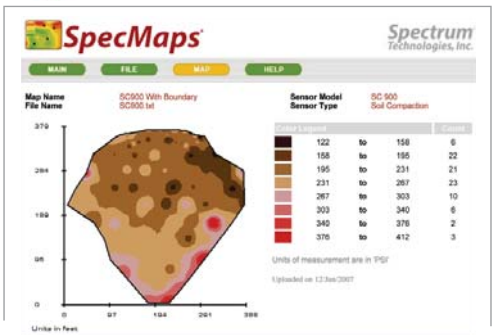


Specifications for Field Scout SC-900

Measurement Units:	Cone Index (PSI or kPa)
Resolution:	1" (2.5 cm), 5 PSI (35 kPa)
Accuracy:	± 0.5" (1.25 cm) Depth, ±15 PSI (103 kPa) Pressure
Range:	0–18" (0–45 cm), 0–1,000 PSI (0–7,000 kPa)
Battery/Life:	4 "AAA" alkaline batteries; approximately 12-month life
Data Logger Capacity:	772 profiles without GPS; 579 profiles with GPS

Item 6110FS	**Field Scout SC 900 Soil Compaction Meter**
Item 2950CV5	**GPS/DGPS Cable**
Item 7250	**GPS Unit Mounting Bracket**

SpecMaps™



SC 900 on a baseball field: Yellow and red spots indicate areas of heavier soil compaction.

Soil Compaction Meters

Spectrum Soil Compaction Meter

Make our super-affordable analog tester your first line of defense. Unseen soil compaction can limit root growth and water and nutrient absorption. An easy-to-read display and durable design make this meter ideal for in-field use and multiple measurements. Features a stainless steel rod with depth marks of 3,6,9,12,15, and 18in (17.6, 18.2, 22.9, 38.1, and 45.7cm.)

Item 6101 **Spectrum Soil Compaction Tester**

Soil Compaction Meter

Unseen soil compaction can limit root growth and water and nutrient absorption. This tester enables you to identify compacted areas in pounds per square inch so that you can use deep tillage or other practices recommended for your area. Features a stainless steel rod with depth marks of 3,6,9,12,15, and 18in (17.6, 18.2, 22.9, 38.1, and 45.7cm.)

Item 6100 **Soil Compaction Tester**

Soil Sampler Probes

Essential for monitoring soil nutrients and nematodes in the soil profile. Soil sampling is extremely important to ensure optimum plant health. Soil samplers allow you to produce a uniform sample for use with your own on-site tests or to send to a lab.

Model HC:
overall length of 20.5in/50cm, an 18in/46cm sampling tube and an 8in/20cm wide handle.
Model J:
overall length of 24in/61cm, a 12in/30cm removable sampling tube., and an 8in/20cm wide handle.
Model LS:
3ft/1m heavy-duty sampler with an 11in/28cm sampling tube, cut-out sleeve, and foot step.
Auger Tube Kit:
overall length of 3ft/1m fully assembled w/ an 8in/20cm auger length and a 12in/30cm wide handle.

Item 6510 **Model HC Soil Sampler**
Item 6505 **Model J Soil Sampler**
Item 6519 **Model LS Soil Sampler**
Item 6500 **Auger Tube Kit - 3ft/1m**

Tough Soil Thermometers

Built of tough, corrosive-resistant stainless steel, these pocket-sized testers are available with digital or analog easy-to-read displays. Dual mode digital tester features slow updates at 15-second intervals or fast updates every second.

Measures temperatures from 0° to 160°F/-17° to 71°C with ± 2° accuracy. Economical analog tester measures 25° to 125°F with ± 1° accuracy. Adjustable nut provides quick calibration.

Item 6300 **Digital Temperature Tester**
Item 6305 **Analog Temperature Tester**
Item 6305M **Analog Temperature Tester - Metric (Celsius) Scale**
Item 6310 **Long-Stem Thermometer** **(-58° to 302°F/-50° to 150°C ± 1.8° Accuracy)**

Soil Moisture Meters

FIELDSCOUT®

Field Scout® TDR 200

Perfect for turf management! Designed specifically for taking accurate, on-the-spot readings of soil moisture to help you make timely watering decisions.

Item 6435FS	**TDR 200 Soil Moisture Meter**
Item 6429FS	**Two 3in/7.5cm Rods**
Item 6431FS	**Two 4.8in/12cm Rods**
Item 6432FS	**Two 8in/20cm Rods**

Mode Settings:

• Volumetric Water Content Mode:
The meter converts a measured electrical signal into percent soil moisture content using an equation valid over a wide range of mineral soils. Calibration for higher clay soils also included.

• Relative Water Content Mode:
The meter displays a relative water content on a scale of 0 to 100 corresponding to a user-defined upper and lower soil moisture reference level. Water deficit, the amount of water needed to bring the soil moisture content up to the upper reference level, is also calculated and displayed. The reference levels are easily programmed into the meter with the accompanying software. Create up to 2 management sites based on your soil types and crop needs.

Field Scout® TDR 100

One-of-a-kind handheld model combines a compact handheld display with a sophisticated soil water sensing probe in an affordable, portable package. Takes a measurement in less than one second! 5ft/1.5m cable included.

Item 6440FS	**TDR 100 Soil Moisture Meter**
Item 6429FS	**Two 3in/7.5cm Rods**
Item 6431FS	**Two 4.8in/12cm Rods**
Item 6432FS	**Two 8in/20cm Rods**
Item 6440FSS	**TDR 100 Soil Moisture Probe**

Measurement Principle: Time-domain measurement methods

Measurement Units: Percent volumetric water content

Resolution: 1.0%

Accuracy: ±3.0% volumetric water content with electrical conductivity – <2mS/cm

Range: 0% to saturation (Saturation typically around 50% volumetric water)

Battery/Life: 4 "AAA" alkaline batteries; approximately 12-month battery life

Data Logger (TDR 300 only): 3,250 without GPS; 1,350 with GPS/DGPS

TDR SOIL MOISTURE METER FEATURES

	Item #	Design	VWC*	RWC**	Display	Avg. Reading	Data Logger	DGPS Port
TDR-100	6440FS	Handheld	•	•	•	•		
TDR-200	6435FS	Pilot grip	•	•	•	•		
TDR-300	6430FS	76cm "T" grip	•	•	•	•	•	•

* VWC: Volumetric Water Content

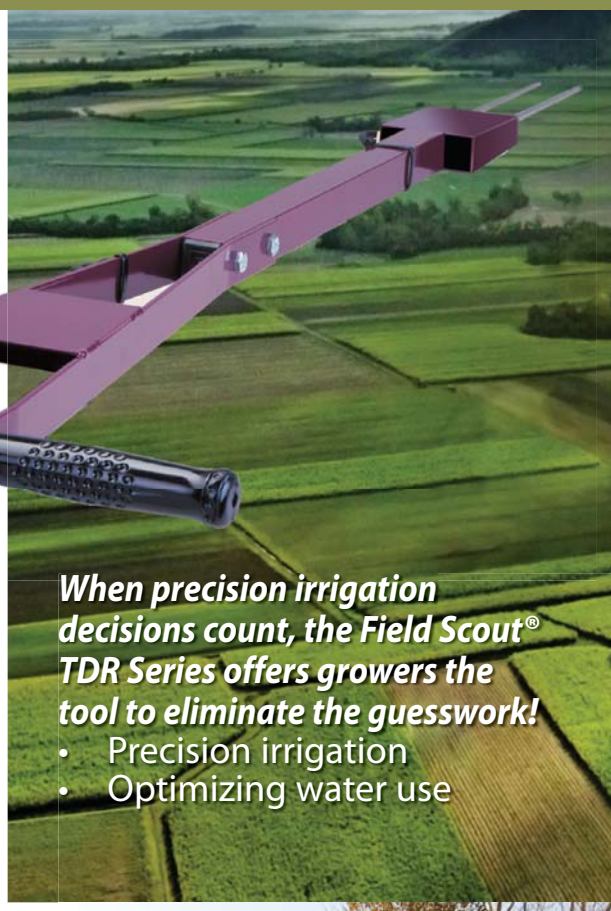
* * RWC: Relative Water Content

FIELDSCOUT®

AE50 outstanding innovations
AWARD WINNER
FOR TECHNOLOGY
INNOVATION

Field Scout® TDR 300 SpecMaps™

Managing water responsibly and reducing operating expenses doesn't need to be difficult. The Field Scout TDR 300 is your solution. Make accurate soil moisture measurements fast and easy. Replace the subjective "soil probe and feel" method with precision measurement of soil moisture. Your crop and budget will thank you. An internal data logger and RS-232 port allow for use with a DGPS for geo-referenced soil moisture measurements. Includes software and PC cable. Use the powerful SpecMaps online application (page 30) and discover the value of spatially variable soil moisture measurements. **Mapping program requires GPS; not included.**

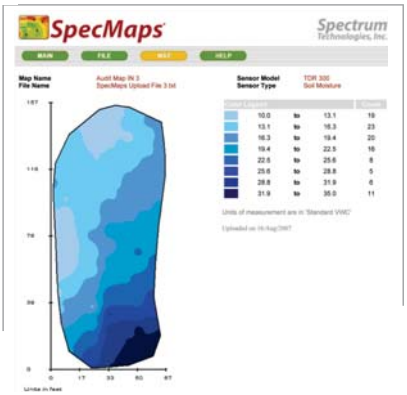

When precision irrigation decisions count, the Field Scout® TDR Series offers growers the tool to eliminate the guesswork!
• Precision irrigation
• Optimizing water use

FEATURES & SPECIFICATIONS

Measurement Principle: Time-domain measurement methods
Measurement Units: Percent volumetric water content
Resolution: 1.0%
Accuracy: ±3.0% volumetric water content with electrical conductivity – <2mS/cm
Range: 0% to saturation (Saturation typically around 50% volumetric water)
Battery/Life: 4 "AAA" alkaline batteries; approximately 12-month battery life
Data Logger: 3,250 measurements without GPS; 1,350 with GPS/DGPS

Item 6430FS	TDR 300 Soil Moisture Meter
Item 6429FS	Two 3in/7.5cm Rods
Item 6431FS	Two 4.8in/12cm Rods
Item 6432FS	Two 8in/20cm Rods
Item 2950CV5	GPS/DGPS Cable
Item 7250	GPS Unit Mounting Bracket

SpecMaps



TDR 300 on a putting green: The areas with higher soil moisture are shown in deep blue.

Item 3652	SpecMaps Web Mapping Utility (1-Year Subscription)

Soil Moisture Meters

Watermark Soil Moisture Meter

Place a Watermark Sensor in the root zone of your crop or turf and use the handheld digital meter to get an instant reading of moisture tension from 0 (saturated) to 200 (dry) centibars. Use in conjunction with evapotranspiration estimates to fine-tune irrigation scheduling. One digital meter reads all your sensors. Each sensor includes a 5ft/1.5m extendable cable. With the Watermark Adaptor, you can also use a Watermark sensor with our WatchDog systems.

Item 6455	Watermark Digital Meter
Item 6450	Watermark Sensor
Item 6450ADPT	Watermark Adaptor

ET Gauge *- Optimizes your water use*

Monitor your crop and soil water loss through evapotranspiration and know precisely when to irrigate. Maintain ideal plant hydration and cut the expenses of precautionary overwatering. The ET gauge is simple and effective. Fill it with distilled water, mount it at your growing site and check the levels periodically. Very affordable compared to electronic gauges costing four times as much. Perfect measurement device for plant, crop and turf managers on a budget. Stands approximately 0.5 meters tall.

Item 3710	ET Gauge

Economy Soil Moisture Meter

This analog soil moisture meter measures any type of soil with just one calibration. A capacitance-type sensor located at the tip of the shaft provides instant results ranging from 0 (dry) to 10 (saturated).

Item 6400	23cm Soil Moisture Tester
Item 6405	61cm Soil Moisture Tester

Irrometer Tensiometers

Reliable Irrometer Tensiometers are exellent indicators for irrigation scheduling. With four different depths to choose from, they tell you how hard plant roots are working to draw water from the soil. Use model "R" for general use with field and tree crops or model "LT" (see our Web site) for coarse soils or greenhouse media. Service kit (one required) includes handheld vacuum pump, fluid concentrate, 25 chart forms and reference book.

Item 6425	Service Kit

Model "R" Tensiometers

Item 6420	30.5cm Depth
Item 6421	45.7cm Depth
Item 6422	61.0cm Depth

Nutrient Management

Management solutions for:

- Nitrate, potassium, and sodium monitoring
- Tissue sap sampling
- Soil/Water macro nutrient sampling

Horiba Cardy Ion Meters

Exceptionally small and portable, Cardy meters literally put the power of laboratory nutrient measurement right in your hands! The Cardy's unique, flat sensor allows you to conveniently and accurately measure small samples. The sensor is stored dry and is field-replaceable. Their accuracy correlates well with laboratory analysis with automatic range switching from 0 to 9,900 ppm.

Rated No. 1 for ease of use in an independent comparison of in-field quick tests, Cardy meters are readily endorsed by university researchers, extension personnel, soil laboratories and many other satisfied users. Each meter comes complete with carrying case, standards, accessories, and a 15-sample soil test kit.

SAMPLE OF GUIDELINES – UC DAVIS

Crop	Stage	Dry Wt. Nitrate-N	Sap Nitrate-N
Tomato	First bloom	10,000–14,000 ppm	700–900 ppm
	1-inch fruits	8,000–9,000	500–600
	First harvest	5,000–6,000	400–500
	Final harvest	3,000–4,000	300–400

University guidelines available for your vegetable crop at www.specmeters.com.

Nutrient Measurement Units

2300 Cardy Nitrate NO_3^- Meter 2400
Cardy Potassium K+ Meter
2500 Cardy Sodium Na+ Meter

*"G" meters do not include materials & standards for mineral soil tests

STANDARDS – Replenishments

2338 450 ppm NO_3^- N DI 30 ml
2339 20 ppm NO_3^- N DI 30 ml
2414 150 ppm K+ DI 30 ml
2418 2,000 ppm K+ DI 30 ml
2510 Solution Set – Na+

Soil Kits and Accessories

2329 Soil Nitrate Kit w/30 Samples
2434 Soil K+ Kit w/30 Samples
2125 Sampling Sheets – 2 Rolls
2135 Sampling Sheets – 4 Rolls
2725 Handheld Plant Sap Press

Replacement Sensors

2340 Nitrate NO_3^- Sensor
2440 K+ Potassium Sensor
2540 Na+ Sodium Sensor

Client Testimonial

At ZZ2 we grow around 1500 hectare tomatoes and 400 hectare onions annually. Our erratic rainfall and temperature fluctuations make the Cardy meter most valuable for fine tuning individual fields and protocol.

Ben Durand, ZZ2
Mooketsi Limpop, South Africa

Hydraulic Plant Sap Press

Speed up collection of large samples with our Hydraulic Plant Sap Press which provides a rapid, easy-to-use method for collecting larger samples. The press extracts sap into a collection vial and comes complete with plunger, grate, cylinder, expeller rod and six collection vials.

Item 2720 Hydraulic Plant Sap Press

Field Scout® pH 110 Meter

Management solutions for:

- pH water and soil monitoring

Field Scout® pH 110 Meter

With built-in data logger and RS-232 port

When accurate pH measurements count, the Field Scout pH 110 meter delivers. With a built-in data logger and RS 232 port, geo-referenced pH measurements are possible in the field (soil pH) or along a river (water pH).

Every measurement is recorded until the user downloads to a PC for analysis. A GPS interface makes it easy to log location and generate geo-referenced soil maps, and manage pH on a site-specific basis. By doing so, growers can reduce waste, increase profits, and maintain the productivity of their soil for maximum economic yields.

The Field Scout pH 100 Meter records ±0.01pH accuracy, range –2.00 to 16.00pH. The logger stores 4096 readings (1,488 w/ GPS). Batteries provide >50 hours use. Automatic buffer recognition allows easy calibration.

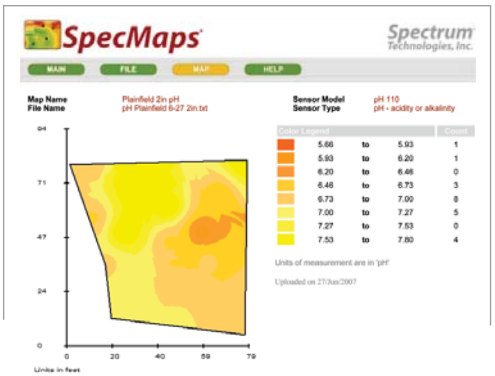
Software and PC cable (included) allows you to download data for use in spreadsheets or mapping software. Includes hard carrying case, software with PC cable, four "AAA" batteries, pH 4 and 7 standards. Order electrode separately.

Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping program requires GPS; not included.**

Item 2120	**Field Scout pH 110 Meter** Excludes pH Electrode – order separately
Item 2121	**Combination pH/Temp Electrode**
Item 2124FE	**Flat End pH Probe** For measuring the exposed surface of soil cores
Item 2950CV5	**GPS/DGPS Cable**

SpecMaps

Field Scout pH 110 Meter: 6in/15cm soil pH data from a lawn.
Red indicates more acidic conditions.



Field Scout® EC 110 Meter

Management solutions for:

- Conductivity (EC) water and soil monitoring

Field Scout® EC 110 Meter

With built-in data logger and RS-232 port

SpecMaps™

When accurate EC measurements count, the Field Scout EC 110 meter delivers. With a direct-insert probe, built-in data logger and RS-232 port, geo-referenced EC measurements are possible in the field (soil EC) or in water. Use with a backpack or handheld GPS unit (not included). Software allows you to download data for use in spreadsheets or mapping software. The Field Scout EC 110 Meter has a range of 0.00 - 199.9 mS/cm with an accuracy of ± 2%. The logger stores 1000 readings (650 w/ GPS). 4 "AAA" batteries provide > 30 hours of use.

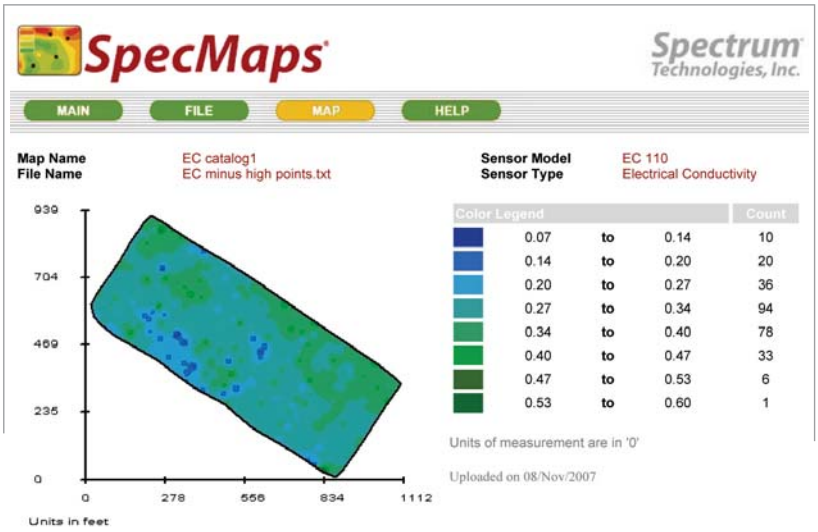
Use the powerful SpecMaps online application (page 30) to discover the value of spatially variable sensor measurements. **Mapping program requires GPS; not included.**

Includes: Software, PC interface cable, and 2.76 mS/cm calibration standard.

Item 2220	**Field Scout EC 110 Meter** Excludes EC Electrode – order separately
Item 2220CC	**Conductivity Cell (Water)**
Item 2220FS	**Field Scout EC Probe (8in/20cm)**
Item 2225FSP	**Field Scout T-Handle** **EC Probe (24in/60cm) w/ Replaceable Tip**
Item 2266	**Replaceable Tip For (24in/60cm) T-Handle EC Probe** (not compatible w/ 2220FS)
Item 2254	**Conductivity Standard 2.76 mS/cm**
Item 2950CV5	**GPS/DGPS Cable**

SpecMaps™

Field Scout EC 110 Meter: 3in/7.5cm EC data from a fairway.
Dark Green indicates high EC.



Item 3652 **SpecMaps Web Mapping Utility (1-Year Subscription)**

pH Measurement

pH Measurement on the go!

pH Pro™ Meter

Get instant soil pH or water pH readings with this robust, field-ready pH Meter. Test your irrigation, spray tank water, or soil samples. Built to last, the pH Pro Meter includes an exclusive 2-year warranty.

ISFET (Ion-Sensitive Field Effect Transistor) technology is now available in the affordable pH Pro Meter.

Features a non-glass, store dry sensor. Auto-calibrates to one buffer, responds quickly, and resists breakage. Typical sensor life is 500+ readings or 150-200 use hours (3-5 year shelf life).

The sensor (reference electrode) provides visual indication when replacement is due. Range: pH 2 to 12; Accuracy:± 0.1 pH; Auto Temp Comp; Two 3 volt batteries; Water-resistant and Auto Power-Off features. Includes: batteries, case and calibration standard.

Check Soil or Spray Tank pH

Item 2100A	**pH Pro Meter Complete**
Item 2139A	**Replacement Sensor**
Item 2117	**pH 7.0 (2) 30 ml ea.**

Horiba Cardy Twin pH

Ideal for testing irrigation water, pesticide water, or rumen pH

pH measurements at your fingertips. Perform your own soil pH test on-site - with no waiting for the lab! Test pH of irrigation water or pesticide spray water. The Cardy Twin performs two-point (pH 4 and pH 7) auto-calibration.The dual action sensor guard protects the electrode and captures samples from buckets, lakes, streams or running water. The revolutionary flat sensor allows measurement of small samples, pastes, powders or solids.

The sensor is replaceable and stores dry. Range: pH 2 to 12;
Accuracy/Repeatability: +/-0.1pH, Auto Temp Comp, Waterproof, Auto Power-Off.

Includes: case, two 3 volt batteries, pH 4 & 7 standards and instructions.

Item 2103A	**Cardy Twin pH Meter**
Item 2110	**Refill Solutions – pH 4 and 7, (2) 30 ml ea.**
Item 2143	**Twin pH Replacement Sensor**

Economy pH/EC Meter

The Economy pH/EC Meter combines two essential readings for efficient crop production: pH and conductivity (EC). Conductivity of soil is an excellent indication of nutritive salt presence. Features 150-hour battery life, temperature compensation, 0.68 TDS ratio calculation, and +/- 0.2 pH/2% EC scale accuracy.

Includes: handheld meter, calibration solution and carrying case.

Item 2182	**Economy pH/EC Meter**

IQ 150 pH Meter

Your fast, easy, and accurate pH measurement solution

A direct ISFET pH probe with a full year warranty. The fully redesigned probe extends a full 15.25cm in length and has a NEW narrower point (4.75cm) which is great for small plug trays and causes less root disturbance. The improved sensor design allows for sampling on the side and prolongs probe life.

The IQ 150 permits instant, accurate measurement of pH in soil media as well as water or nutrient solutions. Use this portable meter for field work, food testing, soil testing, industrial applications and educational use. Probe to measure pH in growing media right on the spot, without conducting tedious soil sampling and preparation.

The IQ 150's tough, stainless steel probe stores dry. A durable ISFET silicon chip sensor eliminates problems associated with glass bulb sensors and accurately measures even a single drop. The ultra-rugged meter is armored in a water-resistant rubber holster and is engineered to withstand a 10ft/3m drop onto concrete.

Features include recognition of 7 buffers, 0.1 or 0.01 pH resolution, automatic or manual temperature compensation, and one-point or two-point calibration. Includes meter, probe, 9 volt battery and user's manual. Does not include calibration standards.

Measurements in 3 easy steps:

WATER
WAIT 30 MINUTES
TAKE YOUR MEASUREMENT

SPECIFICATIONS FOR IQ 150 pH METER

Power: One 9 volt battery (included)
pH Sensor: Stainless steel probe with silicon chip pH sensor
Range: pH – 0 – 14; mV – ±1999; Temp – 0° to 100°C
Calibration: One or two point, automatic
Accuracy/Repeatability: ±0.01 pH ± 1 digit
Auto Temp. Compensation: 0° to 100°C

view the online presentation of the IQ 150 at:
http://www.specmeters.com/iq150

Item 2162S	**IQ 150 pH Meter with ISFET Probe**
Item 2163S	**ISFET Replacement Probe**
Item 2164S	**Field Carrying Case with pH Standards** (required)
Item 2169	**AC Adapter, 110VAC**
Item 2110	**Refill solutions: pH 4 and 7, (2) 30ml ea.**

EC Measurement

Client Testimonial

"I like the speed and ease of use. I can measure all the pots instead of just a few and see EC trends faster."

Bob Hamrick
PanAmerican Seed Co.

Field Scout® Direct Soil EC Meter

Instant and accurate direct EC measurement!

U.S. PATENT NO. 7,183,779

AE50 outstanding innovations
AWARD WINNER
FOR TECHNOLOGY INNOVATION

The salinity of the soil, irrigation water or fertilizer solution is an important parameter affecting the root zone environment of your plants. Any of these factors can have a significant affect on plant growth and quality. The presence of high salt levels is your warning sign to make adjustments. Don't wait for trouble, forecast before the damage shows in your plants.

The Field Scout Direct Soil EC Meter is designed with state-of-the-art sensor technology. Our exclusive paired sensor tip provides maximum soil-sensor contact and higher accuracy. Greenhouse production managers can compare readings from plant to plant, allowing for quick representative readings and is agile enough for sampling directly in plug trays, pots, and containers.

Measurements in 3 easy steps:

WATER
WAIT 30 MINUTES
TAKE YOUR MEASUREMENT

It's that simple. No need for conducting tedious soil sampling and soil preparation techniques. With direct measurement technology, you are able to identify problems painlessly on-the-spot by taking several depth and position readings to give you a truly accurate picture of your plant's growing environment.

The Field Scout Direct Soil EC Meter gives you the information crucial to managing your soil EC levels and with the accuracy of standard SME readings. Adjusting your irrigation and fertility programs based on this data equates to higher plant quality and your increased profits.

The Field Scout Direct Soil EC Meter is your FAST, EASY, and ACCURATE EC measurement solution!

view the online presentation of the Direct Soil EC Meter at:
http://www.specmeters.com/soil_ec

Resolution 0.01 mS/cm. Accuracy ± 2%. Automatic temperature compensation. Includes: case, calibration standard, and battery.

Item 2265FS	**Field Scout Direct Soil EC Meter w/ Probe (8in/20cm)**
Item 2265FSTP	**Field Scout Direct Soil EC Meter w/ T-Handle Probe (24in/60cm) and Replaceable Tip**
Item 2265PROBE	**Field Scout EC Probe (8in/20cm)**
Item 2265FST24P	**Field Scout T-Handle EC Probe (24in/60cm) w/ Replaceable Tip**
Item 2266	**Replaceable Tip For (24in/60cm) T-Handle EC Probe** (not compatible w/ 2265PROBE)
Item 2254	**Conductivity Standard 2.76 mS/cm, 250ml**

Horiba Cardy Twin EC Meter

Ideal for greenhouse applications

A pocket-sized conductivity meter packed with advanced features. This ultra-slim meter features push-button auto-calibration, and automatic temperature compensation. The Cardy Twin EC's miniature sensor accurately measures even a single drop of saturated media extract. Ideal for greenhouse and field applications.

Range: 0–199 µS/cm, 0–19.0 mS/cm;
Resolution: 1 µS/cm, 0.01 mS/cm;
Accuracy: ±2%; Auto Temp. Compensation.

Includes: batteries, case, standard solution and instructions.

Item 2205	**Cardy Twin EC Meter**
Item 2210	**Cardy Twin EC Refill Solution**
Item 2242	**Replacement Sensor**

Waterproof EC Meter

One high accuracy multi-range sensor measures four parameters (Conductivity, TDS, Salinity and Temperature).

Key Features:

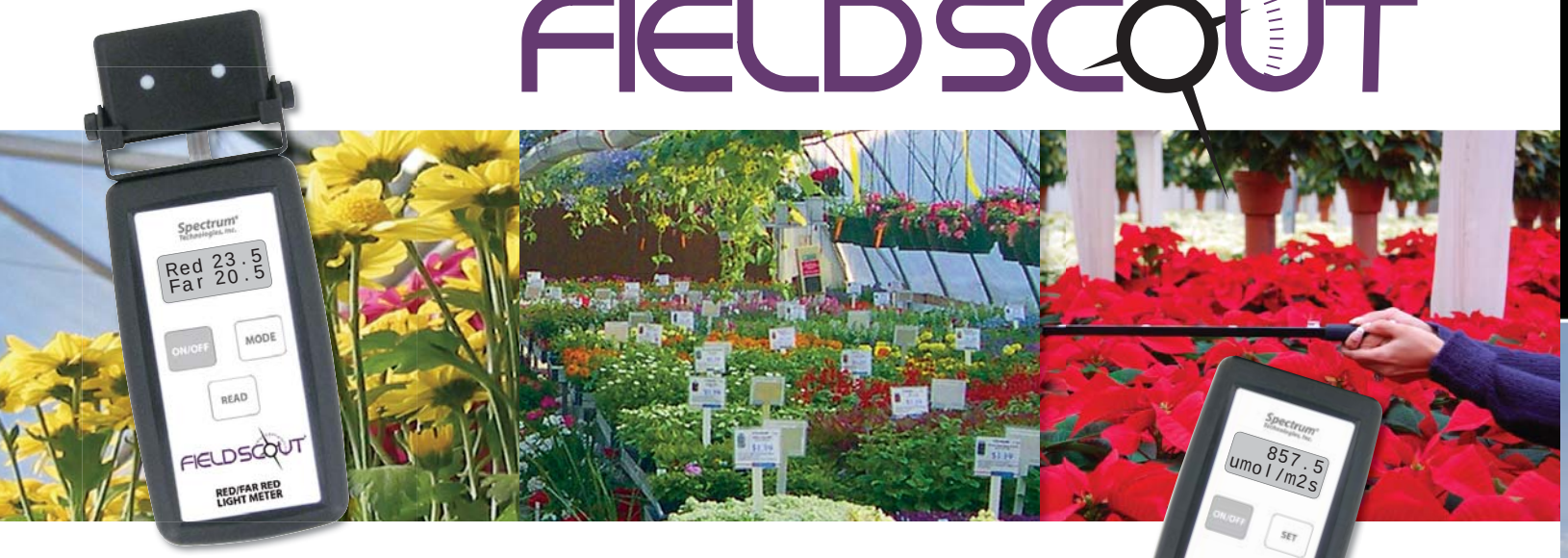
- Auto-ranging meter offers 3 ranges to measure from pure water to saline solution or waste, boiler and cooling water using the same conductivity cell.
- 6 units of measure:µS/cm, mS/cm, ppm, ppt, mg/L, and g/L
- Internal memory stores up to 15 labeled readings for easy recall
- Adjustable conductivity to TDS ratio factor from 0.4 to 1.0
- Self calibration on power-up

Includes: conductivity cell, protective sensor cap, sample cup with cap, four SR44W button batteries, and 48in/1.2m neckstrap. Standards sold separately.

Item 2246	**Waterproof EC Meter**
Item 2251	**Conductivity Standard, 1.41 mS/cm, 230ml**

NEW!

FIELDSCOUT®



Light Meters and Sensors!

Track the energy that drives plant growth. **Field Scout** light meters specifically measure the light spectrums that plants use:

- Quantum Light
- Red/Far Red
- UV

An affordable means to accurately measure radiation for plant growth. **Available in a variety of configurations for your convenience!**

See pages 26 - 27 for more details!

Spectrum®
Technologies, Inc.
"To Measure Is To Know"

12360 South Industrial Drive East
Plainfield, Illinois 60585 USA

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www.specmeters.com

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